RAILROAD GAZETTE

FRIDAY, OCTOBER 14.

NEWS OF THE WEEK

We give below, in a condensed form, the leading news items of the week. These items will be found in detail in their appropriate columns.

Meetings Next Week.—Louisville & Nashville; Carthage & Adirondack; Evansville & Terre Haute.

Elections.—Brighton Beach, James Jourdan President.—Kansas City, Texarkana & Gulf, C. C. Donian President.—Minneapolis & St. Louis, W. H. Truesdale President.—Minnesota & Dakota, Henry Cullee President.—New York & Northern Railway, Joel B. Erhardt, President.

Personal.—Robert Garrett resigns Presidency of the Baltimore & Ohio.

New Companies Organized.—Chattanooga Southern is incorporated in Tennessee.—Emory Coal & Railroad files charter in Tennessee.—Kansas City, Texarkana & Gulf is incorporated in Arkansas.—Lincoln, Red Oak & Des Moines is incorporated in Nebraska.—Owensboro, Falls of Rough & Green River is organized in Kentucky.—Otay is incorporated in California.—Sioux City & Northern is incorporated in Iowa.

Changes and Extensions.—*Alabama:* Eufaula & East Alabama begins work on extension.—*California:* California Southern will build from Perris to San Jacinto.—*Indiana:* Evansville & Indianapolis opens road from Brazil to Saline City. Cincinnati, Indianapolis, St. Louis & Chicago opens Amora extension.—*Kansas:* Arkansas, Kansas & Colorado will build 30 miles extension.—*Maryland:* Baltimore & Drum Point begins work.—*Minnesota:* Minnesota & Dakota will build line from Hawley to Devil's Lake, Dak.—*Mississippi:* Warrior Coal Fields begin grading.—*Michigan:* Kalamazoo & Saginaw is completed to Kingsbury.—*Minnesota:* Duluth & Manitoba is completed to Pambina, Dak.—*North Carolina:* Richmond & Danville will build branch.—*New Mexico:* Atchison, Topeka & Santa Fe will commence the Santa Fe-Gallup cut off.—*Ohio.*—Columbus & Maysville will be extended to Ripley. Wellsville & New Lisbon survey begun.—*Ontario:* Niagara Central is opened.—*Oregon:* Seattle, Lake Shore & Eastern lets contract for 40-mile extension.—*Tennessee:* Rowells Valley has begun work.

Traffic.—Anthracite coal shipments for the week ending Oct. 8 show a decrease of 6.3 per cent., as compared with same period last year; bituminous shipments show increase of 13.4 per cent. Cotton receipts, interior markets, for week ending Oct. 7, show an increase of 18.2 per cent., as compared with the corresponding week last year: shipments show an increase of 35.3 per cent.; seaport receipts show increase of 27.3 per cent.; exports an increase of 90.4 per cent.; cotton in sight is greater than at same date last year by 10.6 per cent.

Miscellaneous.—Baltimore & Ohio Telegraph Co. is sold to the Western Union.—Boston & Maine takes possession of Boston & Lowell.

Contributions.

Per Diem Car Service.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The circulars recently sent out by the Pennsylvania Railroad, the Pennsylvania Company and the New York, Lake Erie & Western Railroad, announcing a change in their method of paying for car service, between themselves and their affiliated lines on and after Oct. 1, and offering to interchange their cars on the same basis with other roads indicating their willingness to do so, prompts me to refer to my communication in the *Railroad Gazette* of May 27 last, in which I depicted a few of the many evils of the present system, and maintained that this system, which had brought the average earnings of freight cars on foreign roads down to the low sum of 18 cents per car per day, less than the actual cost of maintenance, and left them on side tracks 22 hours out of every 24, is one which should be reformed out of existence. I suggested that the fear of the apparently insurmountable obstacles doubtless explained the present inaction. I might have said—and, perhaps, with more truth—that the inaction was due to the fact that the officers having the power to inaugurate a change, in the midst of their multitudinous duties, seemingly of more importance, were without the time necessary to work up the details of an improved car service system, and no practical plan had ever been presented for their adoption. But just previous to my communication several meetings were held at the Trunk Line Commissioner's office by a special car-service committee, appointed by the trunk lines. This committee carefully examined the question in all its different phases, and were, I believe, about a unit in reaching the conclusion that a reduction in the mileage rate to ½ cent per mile and the addition of a per diem charge of 15 cents is entirely practicable, and in operation would bring about the much needed improvement.

The convictions of this special car service committee were again given expression at Atlanta, and as a result of the work begun in New York City the Car Accountants' Convention there in April formulated the "Per Diem Report,"* which has this week been presented to the General Time Convention, followed by the firm conviction of each member of the per-diem committee that it is right in every particular, equitable as a whole, and through its operations would place car service on a more satisfactory basis. The work, then, of providing the way to reform, may be said to have been done, and well done, and the only question that remains is, Will the roads take hold of it? The indications are that they will.

The Pennsylvania is generally thought to be the most practically progressive of any of our railroads. The men there know a good thing when they see it, and knowing, are not slow to act. It is, therefore, not surprising that they should be foremost in making their declaration in favor of this reform. A superficial observer might inquire what does the Pennsylvania expect to gain by going into the per diem system practically alone? When we remember, however, that this system controls more cars than any other in America, and that Pennsylvania Railroad cars proper, and the cars of each of the leased or controlled lines will be subject to the per diem charge when on any line in the system other than the one to which they belong, we can at once see the great force which has here been set to work on each line for the more prompt handling of all cars belonging to the system; then the wisdom of this action becomes plain. Just remember that each road's operating expenses are as separate as though the ownership were entirely distinct and separate; then bear in mind that the efficiency of the operating officer is to a considerable extent reckoned by the balance sheet, and we have some idea of the influence that will operate to protect cars belonging to other lines in the system from delay, and to get the greatest possible performance out of the cars assigned to each operating officer's special territory. There can be no question but that this stroke of policy on the part of the Pennsylvania will largely augment the performance of their own cars on their own lines. And right here is a point for reflection. While the efforts of the operating officers of this system are concentrated upon prompt movement for their own cars, what is the effect as to the cars of other roads not subject to time charges, where the cost is the same, whether sent home within one day or in thirty days? The Erie has promptly answered this question by adopting the new system. For self protection it must have Erie cars when on the Pennsylvania system placed on the same footing as Pennsylvania cars; and for the same reason many other roads must find it to their interest to fall in under the new system. Does any one imagine for a moment that Pennsylvania cars reaching the Erie road will not now be returned more promptly than ever before, and quicker than the cars on which there is no tax for delay? The fact of the matter is, the per diem places a *premium* on the movement of every car subject to the charge, and this fact will lead to the adoption of the plan by one road after another, until the majority of the roads will have the system in operation. Then we can discard the elaborate and expensive mileage system altogether and work on the simple per diem basis.

The plan adopted by the Pennsylvania and Erie roads, so far as it goes, with a single exception, is in exact accord with the Car Accountants' recommendation, and such strong indorsement should go very far towards confirming belief in the soundness of the work done at Atlanta.

The fifth clause of the plan outlined by the Pennsylvania and Erie provides that per diem on cars switched from one road to another for the purpose of receiving or discharging loads shall be paid by the road *on* which the switching is done. In my opinion, the recommendation of the Atlanta convention concerning switched cars and cars of lines and private owners has much merit and should be well considered, notwithstanding the action of these roads in throwing it aside. These features are essential to the best results from the system, and I will at a future time give you my reasons for so thinking.

CAR SERVICE.

* See *Railroad Gazette*, April 29, 1887, page 284.

Editorial Correspondence.—Notes in England.

MANCHESTER, Sept. 22, 1887.

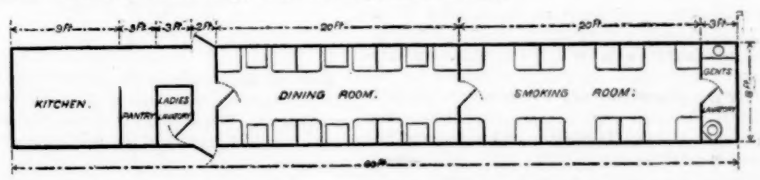
Several important new devices are now being introduced in locomotive practice in England. Not only are nearly 200 compound locomotives now running on the London & Northwestern, Great Eastern and Northeastern railways, but several have been built for other English lines and for India, the colonies and South America. In all cases the compound engines appear to show a decided economy, reaching fully one ton of coal per week, which at even a moderate price will suffice to pay for the royalty and extra cost of compounding in two or three years.

Engine and tender wheels heretofore made of wrought iron requiring much welding are now very generally made of cast steel, the spokes being generally of oval section, as in the driving wheels used in American engines. The cast steel wheels are not, however, cored in any way. On the London & Northwestern the steel wheels are precisely similar in section to the wrought iron wheels. A recent modification especially suitable for truck, tender and car wheels consists of a cast steel body or spider, into the rim of which are forced blocks of teak. These bear on the tire and form an elastic cushion, diminishing noise and vibration and lessening the chance of breaking the tire. The body of the wheel is lipped into the tire on one side and held by a Mansell ring on the other, and therefore a broken tire cannot leave the wheel. The principle of interposing blocks of hard wood between the body of the wheel and the tire was used by the late Mr. Griggs many years ago, and many wheels on this plan are still running on the Old Colony and other roads. Careful records would probably show a large saving in broken tires and axles, and probably the wear of the tires would also be found to be diminished by the use of the elastic wood cushion.

The damp foggy weather so prevalent in England renders the rails much more slippery than in dryer climates, and as both freight and passenger trains are run very fast, it is desirable to use as few coupled wheels as possible. Eight coupled freight engines are unknown, and on many lines heavy express trains are run by engines with a single pair of driving wheels. A considerable weight, sometimes exceeding 34,000 lbs., is placed upon each pair of driving wheels, but there is a limit to the endurance of even 80 and 90 lb. steel rails, and therefore it often happens that engines slip considerably. Sand when used at high speeds or in stormy weather is very apt to be blown to one side and miss the rail entirely. In order to insure the sand being delivered just under the wheels, a jet of compressed air has been used to induce a current of sand after the manner of the sand blast. This method has been found to give fairly good results, and on part of the Midland Railway, an engine fitted with this form of sand blast has been used to work heavy express trains up grades of 53 ft. per mile 15 miles long. The adhesion obtained was so good that the coupling rods were taken off and the engine ran for some months with a single pair of driving wheels. More recently, however, a steam jet has been used instead of compressed air, and is said to give even better results.

Dining cars have been introduced in England within the last few years, but the shorter distances render them less necessary than in America. The through day trains between London and Scotland stop midway for twenty or thirty minutes for dinner, but with this exception the demand for a square meal while traveling is not great. Many railway companies manage the refreshment department themselves, and good dining rooms are provided at the principal stations, so that a traveler can generally find an opportunity to take a meal at any point where he makes connections or "changes carriages," as it is called here. The Midland Railway is distinguished for its excellent management of the "luncheon basket" system. A traveler on giving notice to the guard or conductor, finds a *hot* luncheon brought to the car in a neat basket, provided with knife, fork, salt, etc., not forgetting a bottle of Bass or wine. The meal can be eaten as the train pursues its way, and the luncheon basket is handed back when done with.

The traffic between London and Leeds and the surrounding manufacturing towns in South Yorkshire is considerable, and the competition is keen. The train service is now so arranged that a cloth manufacturer in Leeds can read his letters, leave for London, have luncheon on the dining car en route, spend nearly four hours in London and return by the dining-car train to Leeds in ample time to find his daughters not yet gone to the dance. The double journey, 373½ miles, is done with great punctuality in 8 hours 15 minutes, a speed of over 45 miles per hour including stops. A similar service with a speed of 44 miles per hour is running between Manchester, Sheffield and London. Some of the dining cars used on this service were built in America and others in England. As they do not spend a night on the road, sleeping accommodations are unnecessary, while the absence of a passage through the train renders it necessary that the dining car should be self contained. The dining car, therefore, differs from our hotel cars in being only suitable for use by day. At one end, extending the whole width of the car, is a kitchen, next to which is a pantry containing the stove for heating the car. Then follows a ladies' lavatory, which opens also on an alleyway running across the car. The dining-room opens on this passage, and contains three sections, seating in all only twelve persons. The central passageway appears unnecessarily wide, and though the sections are each about 7 ft. long, the tables are very small, as the seats are fixed, and not arranged to fold up, like the theatre seats used in American dining cars. The seats are, however, very comfortably padded and upholstered. Beyond the dining-room is a smoking-room, also containing twelve seats, and the end of the car is fitted with a gentleman's lavatory.



The accompanying sketch explains the arrangement of the car and shows approximately the dimensions. The ceilings and panels are decorated with very well executed paintings of wild flowers, and while many fittings of the car, especially the ornamental woodwork, are not so well executed as in American cars, the carpets, upholstery and hand paintings leave little to be desired. The car weighs 74,000 lbs. and is carried on two six-wheeled trucks of 12 ft. wheelbase. The wheels are 42 in. diameter, of the usual English pattern, with teak wood centres and Mansell retaining rings. The axles are steel and the journals are 4 in. diameter.

The journal boxes are somewhat peculiar. The whole front of the box is hinged at the bottom and is secured by a simple spring latch at the top. When open it shows the whole of the oiling arrangements and admits of the ready removal or examination of the brass. Two distinct and independent methods of oiling are adopted. Above the brass is an oil chamber with siphons feeding down to the brass, and at the

sides and bottom are suitably made brushes or lubricating pads, gently pressed against the journal by light springs and fed from an oil chamber in the bottom of the box. Such a box is but slightly more expensive to get up than an ordinary box, but can be depended upon to run cool under high speeds; and when 105 miles is run without stopping in less than two hours some effective precautions must be taken against hot boxes.

The arrangement of swing beams and bolster springs is similar to that used on six-wheeled trucks in America, but no equalizer bars are used. An independent semi-elliptic spring is placed over each axle box. It is claimed that the bolsters constitute an equalizing arrangement and that a semi-elliptic spring above each axle box saves the wheel and axle more effectually from the jar in crossing frogs.

The contest as to the best brake for passenger service, lay in England as in America, between the Westinghouse and the Vacuum. While the old Smith vacuum has been gradually altered and improved upon, it is now being supplanted by the automatic vacuum, the joint production of several inventors, most of them railway men. The brake piston is packed with a rolling ring, and when running the piston rests on the bottom of a vertical cylinder, with a vacuum both above and below the piston. The upper side of the piston is virtually the reservoir, and the only communication with it is through a check valve closed by a small brass ball the size of an old-fashioned musket bullet. When a vacuum is created by the ejector on the engine this brass ball falls away from its seat and a vacuum is formed on both the upper and lower sides of the piston, which is consequently placed in equilibrium. When the vacuum is destroyed, the small ball closes the passage to the reservoir and the air pressure, acting only on the lower side of the piston, lifts it and applies the brake. It will thus be seen that the vacuum in the upper chamber is never destroyed or even seriously impaired, and consequently the brake can be applied a considerable number of times in quick succession. This is one of the advantages claimed for the brake. It can also be easily graduated, and the force with which it is applied can be either increased or diminished without releasing the brake. The hose, owing to the moderate pressure, is said to be more durable and the coupling is very simple. The vacuum cylinder is, however, somewhat bulky, and the vertical movement of the piston is not so convenient as the horizontal, a weigh shaft being necessary to communicate the horizontal motion to the brake-shoes. No very reliable trials have been made as to the rapidity of this brake as compared with the Westinghouse automatic.

The diversity of brakes used in England and the extensive interchange of passenger stock renders somewhat peculiar arrangements necessary for working trains throughout with continuous brakes. Many through cars are fitted with two distinct and complete brake apparatus, and with the pipes and couplings of a third system. A general agreement has been arrived at to use the same coupling, the "Clayton," for all vacuum brakes, automatic and non-automatic, but the process of altering the old couplings is not yet complete. The question of interchangeable brakes and couplers has been pretty satisfactorily settled in America as regards passenger rolling stock, and the method of arriving at a solution of the coupler question on freight cars has been clearly pointed out. Unfortunately for freighters, couplings with a considerable amount of slack are likely to be universal on the "wagons" used in English freight service, and the consequent jerks and broken couplings will render any material increase in the train loads impossible.

The question of lowering freight rates by running heavier trains has not been much discussed in England, and indeed the tendency seems to be to use heavier and more powerful freight engines, not to haul heavier trains but to run them faster, so as to keep out of the way of the numerous fast passenger trains and avoid the loss of time in side tracking the freight to allow the passenger trains to pass. The construction of four tracks, and loops or belt lines round cities has to some extent lessened this loss of time, but nevertheless the writer was informed that on one line fast freight trains are run by four coupled engines with 78 in. drivers. There can of course be no doubt that running freight trains at high speed will enable a given train crew to make a large ton mileage, the mileage being increased at the expense of the tonnage. This is probably a more expensive process than increasing the tonnage at the expense of the mileage. In England the loads hauled are practically regulated by the constant occurrence of gradients of 53 ft. or more to the mile, and are therefore somewhat limited. On a crowded line, any breakage of couplings is likely to delay several trains, and this has been an additional objection to heavy trains. Where numerous fast trains are run the time taken to sidetrack is also an important element, and it is evident that a light freight train can not only be run further without having to sidetrack, but can also be sidetracked in less time. On some lines with a heavy mineral traffic and few passenger trains, the freight trains are heavy and are run at a moderate speed, though even in such cases the net load hauled seldom exceeds 500 gross tons. On the London & Northwestern main line, which has now four tracks, trains of 45 coal wagons are now run regularly. Reckoning each wagon to contain 8 gross tons, which is a fair average, the paying load would be only 360 gross tons, and as the cars have to return empty, the average paying load on both journeys is only 180 gross tons, or about 202 net tons, which is considerably below the average tonnage on many American lines. The adoption of eight-wheel cars with tight couplings and a continuous freight brake appears to be the only way by which a heavier train load can be hauled. Such cars could also be run safely at a considerable speed, but their adoption in England is as yet hardly mooted.

The expensive character of the works on English railways is forcibly illustrated by a ride from Newcastle-on-Tyne to Manchester, taken by the writer to-day. The distance is only 143 miles, but the line crosses two tidal rivers by bridges over 100 feet above water level, allowing seagoing ships to pass under without using any swing bridges. The line has also three tunnels, each over one mile in length, one being no less than three miles long. There are also seven smaller tunnels, several long stone viaducts and other expensive works. Some 25 miles of the line from Mirfield to Staleybridge is being four tracked. This section includes the three-mile tunnel, which was originally constructed for a single track, and was then widened. The road approaches this tunnel up the sides of deep valleys. On the northern slope of the divide (for the tunnel pierces the backbone of England), the line has been widened chiefly by cutting further into the hillside, but on the southern slope it was found cheapest to put the additional two tracks on the other side of the valley. This is probably a unique method of widening a line. The gradients are very similar, but owing to the curves of the valley, one line seen from the other appears now higher and now lower as the train rushes down the grade. The line was originally built nearly 50 years ago, and the local stone was used for bridges, retaining walls, etc., but on the widening a very hard brick, nearly black in color, is used. This brick is brought from South Staffordshire, 100 miles distant, and is locally known as "blue brick," the color being produced by oxide of iron in the clay. The surface is smooth and glistening, and experience has shown that the bricks are not only much stronger than any other, but are very durable.

The summit tunnel, before referred to, is the only portion of the line that is level, and therefore jerk water troughs have been placed in the centre of the tunnel. They are supplied with water from a canal reservoir or feeder, which is situated on the moors above the tunnel.

Tank engines with a jerk water apparatus are now being introduced on the London & Northwestern, and it is hoped that by the aid of the economy effected by the use of the compound system and other methods still in an experimental stage, main line trains may be worked by a compound eight-wheeled engine without any tender. This engine has six drivers and one pair of leading radial wheels. The gain in simplicity, cost and dead weight is obvious. Tenders with jerk water apparatus were first used in 1861, but their application to tank engines is probably entirely novel.

The Jubilee Exhibitions now open at Newcastle and Manchester contain many locomotives and much fine machinery, but any notice of these exhibitions must be deferred for a future letter. The Manchester exhibition contains a magnificent loan collection of pictures, selected from those painted during the fifty years of the Queen's reign. Such a splendid collection of good wooden pictures has probably never before been brought together, and to a lover of pictures it is alone worth a trip across the Atlantic.

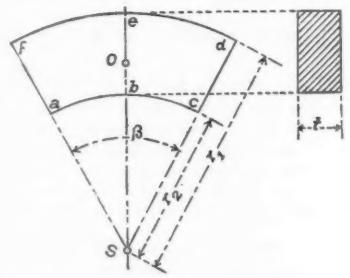
Counterbalancing Locomotives.

ALTOONA, Sept. 12, 1887.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I send you the following method for determining the proportions of counterbalances for locomotives.

Proceed as follows: Ascertain by calculation or by weighing the actual load which rests on each crank pin. Add to this one-sixth of the weight of reciprocating parts for a 4 coupled engine; two-ninths of the weight of reciprocating parts for a 3 coupled engine; one-third of the weight of reciprocating parts for a 2 coupled engine.



Multiply this weight by the radius of the crank arm = ½ piston stroke, and the result = M, is equal to the moment to be balanced. The distance OS from the centre of the wheel to the centre of gravity of the area $abcd\,ef$ is by Weisbach's formula:

$$OS = \frac{4}{3}\,\frac{\sin\frac{\beta}{2}}{\beta}\left(\frac{r_1^3 - r_2^3}{r_1^2 - r_2^2}\right)$$

In this formula β should be arc β for radius = 1. This formula is given in the same form by Reuleaux and Huette. This formula might lead to mistakes, when given β in degrees, and to avoid this, we will convert the same to

$$\text{I.}\qquad OS = \frac{4}{3}\,\frac{\sin\frac{\beta}{2}}{\text{arc }\beta}\left(\frac{r_1^3 - r_2^3}{r_1^2 - r_2^2}\right)$$

$$\text{arc } \beta \text{ of radius} = 1 = \frac{2 \,.\, 1 \,.\, \pi\,\beta}{360} = \frac{\pi\,\beta}{180}$$

which gives

$$\text{II.}\qquad OS = 240\,\frac{\sin\frac{\beta}{2}}{\pi\,\beta}\left(\frac{r_1^3 - r_2^3}{r_1^2 - r_2^2}\right)$$

$$\text{The area of } a\,b\,c\,d\,e\,f = \frac{\pi\,\beta}{360}\,(r_1^2 - r_2^2)$$

t = thickness of counter weight, w = weight per cu. in. in lbs., then the total weight is

$$\text{III.}\qquad W = \frac{w \,.\, t \,.\, \pi \,.\, \beta}{360}\,(r_1^2 - r_2^2).$$

If we multiply formula I with III, and II with III, we get the moment of the counterbalance, which is to be equal M, therefore

$$\text{IV.}\quad M = \frac{4}{3}\left[\frac{r_1^3 - r_2^3}{r_1^2 - r_2^2}\right]\,\frac{\sin\frac{\beta}{2}}{\text{arc }\beta}\,.\,\frac{w \,.\, t \,.\, \pi\,\beta}{360}\quad (r_1^3 - r_2^2)$$

$$\text{V.}\quad M = 240\left[\frac{r_1^3 - r_2^3}{r_1^2 - r_2^2}\right]\,\frac{\sin\frac{\beta}{2}}{\pi \,.\, \beta}\,.\,\frac{w \,.\, t \,.\, \pi \,.\, \beta}{360}\quad (r^{12} - r_2^2)$$

By formula IV and V we find:

$$\text{VI.}\qquad r_2 = \sqrt[3]{r_1^3 - \frac{270 \text{ arc } \beta \,.\, M}{\sin\frac{\beta}{2} \,.\, t \,.\, w \,.\, \beta \,.\, \pi}}$$

$$\text{VII.}\qquad r_2 = \sqrt[3]{r_1^3 - \frac{1{,}5\;M}{t \,.\, w \,.\, \sin\frac{\beta}{2}}}$$

Formula VII is the simplest and we will use this one for an example of a three coupled engine.

WEIGHTS FOUND BY WEIGHING AND TRANSFERRING TO EACH PIN.

	Front pin. Lbs.	Main pin. Lbs.	Back pin. Lbs.
Revolving parts:			
Front parallel rod	113	142	.....
Back " "	.....	73	124½
Connecting rod	.....	190	.....
Pin	38	80	38
Reciprocating parts:			
Piston and rod 249 lbs.			
Cross head 157 lbs.			
Connecting rod 139½ lbs.			
Total 545½ lbs.			
⅔ . 545½ = 121	121	121	121
Total	272	606	283½

Radius of crank-arm = 11 inches.

M = Moment front wheel = 11 × 272 = 2,992 inch lbs
M_1 = " main " = 11 × 606 = 6,666 "
M_2 = " back " = 11 × 283½ = 3,118 "

r_1 is the same for all three wheels = 23¾″; r_1^3 = 13,396; t = 3; w = 0,41 for lead; β = 90°: sin 45° = 0.707, and formula VII will be:

$$r_2 = \sqrt[3]{13396 - 1.725\,M}$$

$$r_2 \text{ front wheel} = \sqrt[3]{13396 - 1.725 \times 2992} = 20.2''$$

$$r_2 \text{ main " } = \sqrt[3]{13376 - 1.725 \times 6666} = 12.4''$$

$$r_2 \text{ back " } = \sqrt[3]{13396 - 1.725 \times 3118} = 20''$$

This requires that the centre of gravity of the skeleton wheel corresponds with the centre of the wheel.

WALTER VIELHABER.

River Bank Protection on the Wabash Railway.

PHŒNIX, Ariz., Oct. 1, 1887.

TO THE EDITOR OF THE RAILROAD GAZETTE:

My attention has been called to a letter written by C. H. Talmage, Resident Engineer, etc., published in your issue of June 24, 1887.

I take exception to his remark in which he refers to "the work of the last two and one-half years, all other and previous work having been unsuccessful."

While Resident Engineer of the Wabash road myself, previous to that date, I constructed a protection at St. Charles which still stands, and later on I constructed a dyke at De Witt, Mo., involving principles I had never seen applied to river protection except my St. Charles work, and there by accident, which has completely fulfilled its purpose, and has been followed in all real protection work since done by the Wabash Railway. The principle was so new and so astonishing that Mr. Talmage's father, then manager of the road, on seeing it for the first time stopped all work upon it, and my relief from duty on the Wabash soon followed, to be succeeded by Mr. C. H. Talmage; but happily I had been able to do enough to demonstrate my idea and protect a piece of track which had been an eyesore and an expense from the time the track was laid until the protection I designed was given it. When Mr. Talmage, the Manager, subsequently passed over the road with his English committee he stopped his car at De Witt and pointed out this piece of track to them; pointed out to them the principle on which it was based and said to them that it was the only protection work on the Missouri River of any account, and that he had ordered it done and in that way.

C. S. MASTEN,
Vice-Pres. and Manager Maricopa & Phœnix Railroad.

[Mr. Masten does not quote Mr. C. H. Talmage quite correctly, as he does not speak of the "previous work" as unsuccessful, but as having been undertaken only at times of emergency, and therefore less successful and more costly than it would have been if undertaken with due foresight. As to what Mr. A. A.

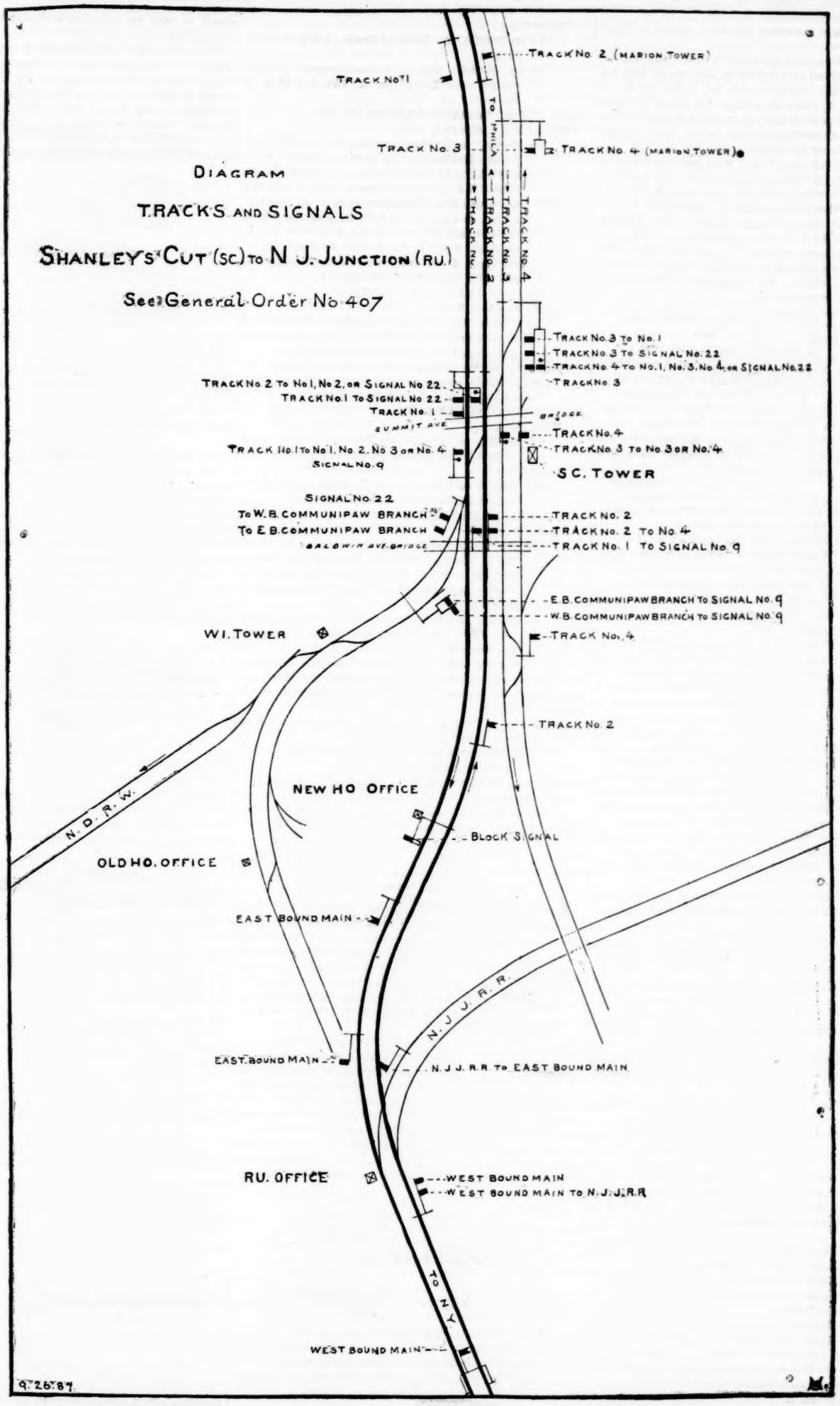


DIAGRAM
TRACKS AND SIGNALS
SHANLEY'S CUT (SC) TO N J. JUNCTION (RU.)
See General Order No 407
TRACK No 1
TRACK No. 2 (MARION TOWER)
TRACK No. 3
TRACK No. 4 (MARION TOWER)
TO PHILA.
TRACK No. 1
TRACK No. 2
TRACK No. 3
TRACK No. 4
TRACK No. 3 to No. 1
TRACK No. 3 to SIGNAL No. 22
TRACK No. 4 to No. 1, No. 3, No. 4, or SIGNAL No. 22
TRACK No. 3
TRACK No. 2 To No 1, No 2, or SIGNAL No 22
TRACK No. 1 To SIGNAL No 22
TRACK No. 1
BRIDGE
SUMMIT AVE
TRACK No. 4
TRACK No. 3 to No 3 OR No. 4
TRACK No. 1 To No 1, No 2, No 3 or No. 4
SIGNAL No. 9
S.C. TOWER
SIGNAL No. 22
To W.B. COMMUNIPAW BRANCH
To E.B. COMMUNIPAW BRANCH
BALDWIN AVE. BRIDGE
TRACK No. 2
TRACK No. 2 To No. 4
TRACK No. 1 TO SIGNAL No. 9
E.B. COMMUNIPAW BRANCH To SIGNAL No. 9
W.B. COMMUNIPAW BRANCH To SIGNAL No. 9
TRACK No. 4
WI. TOWER
TRACK No. 2
N.D.R.W.
NEW HO OFFICE
BLOCK SIGNAL
OLD HO. OFFICE
EAST BOUND MAIN
N.J.J.R.R.
EAST BOUND MAIN
N.J.J.R.R. to EAST BOUND MAIN
RU. OFFICE
WEST BOUND MAIN
WEST BOUND MAIN to N.J.J.R.R.
TO N.Y.
WEST BOUND MAIN
9.26.87

Talmage said, he being dead, it is impossible now to know just the words or their implication; but probably there was no intention of doing Mr. Masten an injustice.—EDITOR RAILROAD GAZETTE.]

New Interlocking at Bergen Hill—Pennsylvania Railroad.

The change of tracks through Bergen Hill, Jersey City, on the New York division of the Pennsylvania Railroad, made Sunday, Oct. 2, required a complete revision in the 19 lever interlocking machine at Shanley's cut tower, 18 new signals, and 13 new levers, and some 15,000 ft. of 1 in. pipe being put in.

This is one of the busiest junctions on the division, an average of some 410 train movements being made daily. One day last August it reached a movement of 471 trains. To change from the old machine to the new required the tearing out of the 19 lever machine and signals, and putting a 32 lever machine, new connections and signals in its place—a matter of no little difficulty to carry out without any delay to traffic. This was accomplished, however, without a hitch of any kind. The hours between 10 p. m., Saturday, and 6 a. m., Monday, were selected and the old machine put out of service and a force of some 25 men started in, removing the old signals and connections, and fitting the locking on the new 32 lever machine, and connecting it with the new signals and switches, so that promptly at 6 a. m., Monday, the first train was controlled by the new signals.

During the time the interlocking was out of service the switches were operated by five switchmen, under the direction of an operator, requiring ten switchmen and three operators (working eight hours each), to operate this junction with hand levers, while with interlocking but three operators and two lampmen are required for the twenty-four hours. This comparison would show that aside from all questions of

safety, interlocking at important junctions effects an enormous saving in labor.

This junction differs from many others in the fact that signals have been provided for *all* possible movements with but three exceptions, viz.: Track No. 2 to No. 3, No. 3 to No. 2, and No. 4 to No. 2, these movements not being required With this arrangement trains can be run in both directions on all tracks without resorting to the use of hand signals. The reverse movements are, however, used for drilling.

We give the general orders that were issued on the occasion of the change, as well as the diagram which accompanied them, for the reason that the rapid extension of interlocking systems makes this excellent and thoroughly worked out example interesting to many readers. The diagram is precisely as prepared for the information of employés. The westerly movement is toward the top of the plate. The loop of old track, now disused for through trains, is indicated on the left of the middle. The typography of the orders is retained as closely as practicable:

Pennsylvania Railroad Co., New York Division,
SUPT.'S OFFICE, JERSEY CITY, September 27, 1887.

GENERAL ORDER NO. 406.

On SATURDAY, OCTOBER 1, 1887, at 10 P. M.

The Interlocking System of Switches and Signals at Shanley's Cut (SC) and the East Bound Distant Signal for Communipaw Junction (W I) Tower, will be put out of service.

All trains must approach Shanley's Cut under perfect control and be governed by Hand Signals on the Ground.

Trains on Tracks Nos. 1 and 2 between Marion Tower and Communipaw Junction, will be run as a single block governed by the (D N) and (W I) signals.

JOS. CRAWFORD, Superintendent.

Pennsylvania Railroad Co., New York Division,
SUPT.'S OFFICE, JERSEY CITY, September 28, 1887.

GENERAL ORDER NO. 407.

On SUNDAY, OCTOBER 2d, 1887, at 8:15 A. M.:

The West Bound Track will be connected with New Line, at New Jersey Junction (R U) and at Shanley's Cut (S C) and the present track abandoned, as a running track.

At same time the new H O Block Signals, located half way between S C and R U, will be put in service.

On same date, at 12:45 P. M.:

The East Bound Track will be connected with New Line at Shanley's Cut (S C) and New Jersey Junction (R U) and the present track abandoned, as a running track.

The East Bound Distant Signals for R U will be moved to a point on New Line 1,055 feet West of Home, South of tracks.

After Changes of Tracks the new H O Block Signals will govern trains between that point and Marion Tower (D N), and the block between D N and W I as per General Order No. 406 abandoned. This arrangement will continue until the Interlocking Signals are put in service at Shanley's Cut, the block will then be between Marion and Shanley's Cut and Shanley's Cut and new H O Office.

At same time, the Block Signals on Old Line at W I and H O will be abandoned.

Trains must not exceed 15 miles per hour passing over new tracks until further notice.

Trains to and from National Docks Railway will use crossover at W I Tower as at present, and will be governed by Operator at that point.

On MONDAY, OCT. 3, 1887, at 6 A. M.

The Interlocking System will be put into service at SHANLEY'S CUT (S C).

Trains will be governed by signals as follows:

EAST-BOUND—

Track No. 1.

1st By DISTANT, South of Tracks 1,800 feet from Home.

2d By HOME, the Upper Arm on Two-arm Post, on Bracket over Track No. 1, 356 feet West of Tower.

Track No. 1, to East or West Bound, Communipaw Branch.

By HOME, the Lower Arm on Two-arm Post, on Bracket over Track No. 1, 356 feet West of Tower. (This Signal only gives the right to go to Signal No. 22, located 240 feet East of Tower, South of Tracks. The Upper Arm of Signal No. 22 indicates to East-bound and Lower Arm to West-bound, Communipaw Branch.)

Track No. 3.

1st By DISTANT, South side of Bracket Post, North of Tracks, 1,100 ft. from Home.

2d By HOME, the Upper Arm on Three-arm Post, on South side of Bracket, North of Tracks, 653 ft. West of Tower.

Track No. 3 to East or West-Bound, Communipaw Branch—

By HOME, the Middle Arm on Three-arm Post, on South side of Bracket, North of Tracks, 653 ft. West of Tower. (This Signal only gives the right to go to Signal No. 22, as before described.)

Track No. 3 to No. 1.

By HOME, the Lowest Arm on Three-arm Post, on South side of Bracket, North of Tracks, 653 ft. West of Tower.

WEST-BOUND—

Track No. 2.

1st By DISTANT: North of Track No. 2, 1,000 feet from Home.

2d By HOME: the Upper arm on Two-arm Post, on Baldwin Avenue Bridge, over Track No. 2, 460 feet East of Tower.

Track No. 2 to No. 4.

By HOME: the Lower Arm on Two-Arm Post, on Baldwin Avenue Bridge, over Track No. 2, 460 feet East of Tower.

Track No. 4.

1st By DISTANT: North of Tracks, 1,054 feet from HOME.

2d By HOME: Suspended from Summit Avenue Bridge, over Track No. 4, 132 feet West of Tower.

WEST BOUND COMMUNIPAW BRANCH to

Tracks Nos. 1, 2, 3 or 4.

By HOME: on North side of Bracket Post, North of Branch Tracks, 575 feet East of Tower. (This SIGNAL only gives right to go to Signal No. 9, located 154 feet East of Tower, south of Tracks.) Signal No. 9 will display when in safety position, a Disc, showing by numbers the route for which the switches are set. If set for Track No. 1, the figure **1** will be shown; if for Track No. 2, the figure **2**; if for Track No. 3, the figure **3**, and if for Track No. 4, the figure **4**.

EAST BOUND COMMUNIPAW BRANCH to

Tracks Nos. 1, 2, 3 or 4.

By HOME: on south side of Bracket Post, North of Branch Tracks. [This Signal only gives right to go to Signal No. 9, as before described.]

Trains drilling or making movements not already defined, will be governed by Semaphore Signals, with Indicating Discs, and located as follows:

EAST BOUND MOVEMENTS.

Track No. 2.

By HOME: on Bracket over Track No. 2, and North of East-Bound Signals for Track No. 1.

Track No. 4.

By HOME, on Bracket North of Three-arm Post for East-Bound Signals for Track No. 3.

WEST BOUND MOVEMENTS.

Track No. 1.

By HOME, on Baldwin Avenue Bridge over Track No. 1, South of Two-arm Post, for West Bound Signals for Track No. 2. (This Signal only gives right to go to Signal No. 9, as before described.)

Track No. 3.

By HOME, suspended from Summit Avenue Bridge, over Track No. 3, South of West Bound Signal for Track No. 4.

The indicating Discs will display Numbers indicating the various routes in same manner as Signal No. 9, except when route is set leading to Signal No. 22; the letter "X" will then be shown.

Attention of Trainmen is called to Rule 90, Book of Rules, and Rule 37 of Special Rules.

Home Signals governing movement to or on Tracks Nos. 3 and 4 indicate position of Switches only.

GENERAL ORDER No. 406 IS HEREBY ANNULLED.

See diagram.

Copies of this Order can be obtained from Heads of Departments, and should be pasted in Book of Special Rules.

JOS. CRAWFORD,
Superintendent.

Seamless Tubes from Solid Blanks.

There has been considerable interest lately in the recent German processes for making seamless tubes from solid blanks, and we give herewith cuts showing some of the methods. It will be seen that the rolls are placed so that their axes lie in vertical planes parallel with each other, and in oblique planes not parallel, and inclined to the horizontal at certain varying angles.

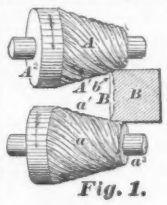


Fig. 1.

The faces of the rolls are conical and grooved or ridged spirally. The inclination of the axes and the coning of the rolls, it is said, depend upon the effect which is sought, and vary with different materials. The grooving of the faces of the rolls is not essential. Ordinarily three or four rolls are employed to preserve the direction of the blank as it travels through; but this is done by guides when two rolls only are employed. As the blank passes through the rolls the surface is carried forward more rapidly

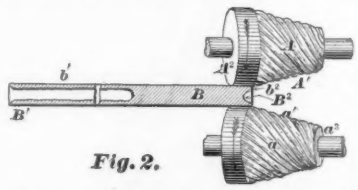


Fig. 2.

than the interior of the ingot, and the result is that it finally leaves the rolls, where the space between them is least, in the form of a seamless tube, with a smooth interior surface. In fig. 1, which is a plan, the blank *B* is shown as just engaged

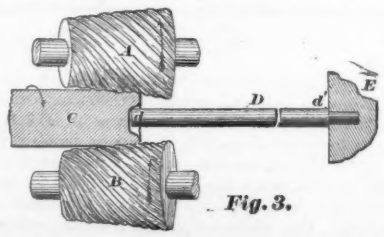


Fig. 3.

by the rolls *A a* and the flange shown at the forward end of the blank is the beginning of the tube. In fig. 2 is shown the tube as finished. It will be seen that the end of the tube is closed, so that the process is well adapted for the formation of tubes having one end solid.

In figs. 3 and 4 is shown a modification, in which the tube is formed over a punch, which prevents the end of the tube being closed at the conclusion of the process. This form is used in making tubes from iron or steel, in which metals the blank is highly heated before being put into the rolls. The small conical fragment marked C^2, fig. 4, at the end of the punch d^2, is all that remains of the ingot when the tube is finished. The employment of this punch renders it unnecessary to reduce the diameter of the blank so much as when the rolls are used without the punch. When the blanks are metals which are comparatively soft and ductile and do not need to be heated to a high temperature before rolling, a

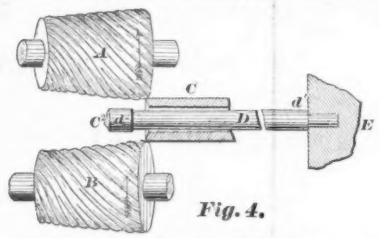


Fig. 4.

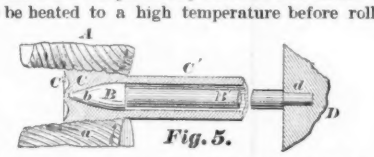


Fig. 5.

mandrel with a conical point is used, as shown at *B*, fig. 5. By this process a tube is made, the inner diameter of which is determined by the base of the cone *B*. It is suggested that this mandrel maybe made hollow and kept cool by the circulation of a fluid through its interior.

In figs. 6 and 7 is shown still another modification of the process, in which the mandel *C* aids in carrying forward the metal of which the tube is formed. It will be seen that the mandrel has a conical head with spiral grooves. The blank

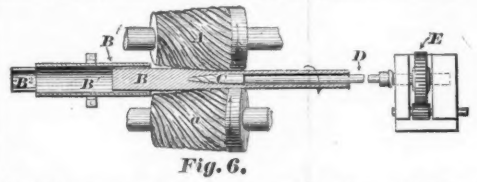


Fig. 6.

B is fed into the rolls through a guide tube *B'*. The speed with which the blank is fed forward may be somewhat moderated by causing the mandrel *C* to rotate in the same direction as that in which the blank itself is revolving, or it may be accelerated by causing the mandrel to revolve in the opposite direction. It is said that tubes made by this process

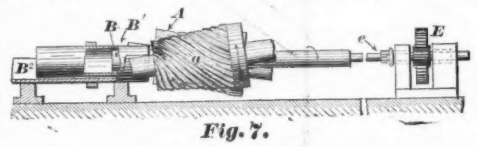


Fig. 7.

have a comparatively smooth internal surface, and the fibres are continuous and lie spirally around the axis of the tube. For making tubes of copper or other soft metals of a diameter larger than that of the blank, the method shown in fig. 10 is used. Here the rolls are not cones, but somewhat barrel-shaped. In this case it will be seen that the blank engages at the larger end of the rolls, and is forced forward over the conical mandrel.

Another process is based upon the discovery that by suitably adjusting the angles of the axes and faces of the rolls, and their lengths, they will operate to develop a tubular formation in any part of a solid metal ingot or blank which is submitted to their action, by causing a rupture of the metal along the line of the geometric axis, as shown in fig. 8. The desired rupturing effect and radial displacement of the metal from the centre of the blank are most easily effected by the employment of two rolls, which act on opposite sides of the blank. The forces to which the blank is subjected in its passage between the rolls are of complex character. The

Fig. 8.

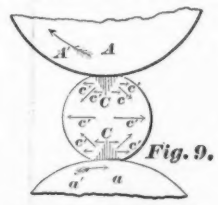


Fig. 9.

two rolls act upon the opposite sides of the blank with a kneading effect, compressing the metal against which they impinge to a certain depth beneath the surface. The area of the metal thus compressed is indicated approximately by the lined triangles *C C*, shown in fig. 9. The direction in which the forces of compression are propagated from the places where the rolls impinge upon the blank is indicated by the diverging arrows. It will be seen that the resultant effect of these forces is to impart to the part of the blank under compression a tendency to expand laterally. The final effect of the action of the rolls is to compact the surface and cause a rupture along the axis of the blank, and this action aids the longitudinal action in producing a tube with comparatively smooth interior surface.

Tubes made by this process are said to be well finished

both inside and out, and some specimens shown in this country seem to sustain the statement. We have no particulars as to cost of manufacture, probable selling price, and range of sizes which can be manufactured. The process is,

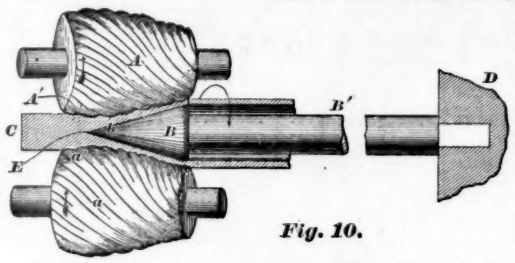


Fig. 10.

apparently, a cheap one, and seems suitable for producing tubes up to 4 or 5 in. in diameter at least. Such tubes are pretty sure to supersede the ordinary lap-welded boiler tubes in use at present, if there is no marked difference in price. Iron pipes and tubes, as is well known, have a fibrous structure, the fibres lying longitudinally, so that the resistance to rupture is across the fibres, or in the weakest direction of the material; and, moreover, the strength of such tubes is measured by the resistance of the weakest part, which is generally the weld. Steel, on the contrary, has a crystalline structure, and offers equal resistance in all directions; and not being weakened by a weld, the strength of the steel tube is measured by the tensile strength of the material composing it.

A process has been patented in this country, but not yet introduced, for rolling seamless steel tubes of any size from hollow ingots while in a heated state. For tubes and pipes of moderate dimensions, the hollow ingot is cast with an internal diameter equal to the finished size, and this ingot is drawn, over a mandrel, through adjustable rolls which, in successive passes, reduce the ingot to a pipe or tube of the required thickness. For very large cylinders, such as water-mains and boiler-shells, the hollow ingot is cast with the required outside diameter and is drawn through rolls over an expanding mandrel, the internal diameter being increased at each pass, until a cylinder or pipe of the desired thickness is produced.

It will be evident that, since seamless steel tubes have much greater strength than welded or riveted iron tubes of the same thickness, the former can be much thinner and consequently lighter, for given pressures, than the iron tubes, or will be suitable for much higher pressures if made of the same thickness. Indeed, if well-finished seamless steel tubes can be produced, at moderate cost and of suitable sizes, no arguments will be required to introduce them; and we shall look with interest to all movements made for putting them upon the market.

We are indebted to the *American Machinist* for the cuts which illustrate the German processes.

Car Heating.

Below will be found a summary of the information which we have gathered as to the steps taken by various railroad companies toward adopting continuous heating systems or other safety heating apparatus. Of course the information is far from complete, but it is an indication of what is doing. In the first group are the names of the roads that have already equipped cars with continuous systems, or have ordered cars equipped. Among them are many with which the equipment is merely experimental, and in fact more or less of it has been done by the heating companies at their own cost, for trial:

Atchison, Topeka & Santa Fe has adopted the Emerson system.

Beech Creek has 1 engine and 2 cars with the Martin.

Boston & Albany has adopted the Martin, and has 35 locomotives and 119 cars equipped.

Boston & Providence will use the Sewall system and the Gold. It has 40 cars equipped with the Sewall and 10 cars with the Gold.

Buffalo, Rochester & Pittsburgh, 2 engines and 6 cars with the Martin. Will also try the Safety Car Heating & Lighting Co.'s system.

Central of New Jersey, 3 cars with the Gold.

Central Vermont, one train Williames equipped.

Chicago, Milwaukee & St. Paul, 1 engine and 5 cars with Martin.

Cincinnati, Indianapolis, St. Louis & Chicago; Safety Car Heating & Lighting Co.'s.

Cleveland, Columbus, Cincinnati & Indianapolis, 2 engines and 7 cars with the Martin.

Delaware & Hudson Canal Co.; Safety Heating & Lighting Co.'s system.

Dunkirk, Allegheny Valley & Pittsburgh has adopted the Martin; 4 engines and 11 cars equipped.

East End (Memphis, Tenn.), 2 cars, Gold system.

Inter-colonial; Sewall, Martin (7 engines and 8 cars), Graydon and Hurley systems.

Inter-state Rapid Transit (Kansas City), 24 cars, Gold system.

Kings County Elevated has adopted the Martin, equipping 30 engines and 80 cars.

Lake Shore & Michigan Southern, 2 engines and 5 cars with the Martin.

Long Island has 1 engine and 2 cars with the Martin and 22 cars with the Gold.

Manhattan Elevated, 919 cars with Gold system.

Missouri Pacific; Safety Car Heating & Lighting Co.'s system.

New Brunswick; Sewall system.

New York Central & Hudson River has adopted the Martin, and has equipped or is equipping 22 engines and 130 cars.

New York, Lake Erie & Western will equip two trains (local) with the Martin and two through trains in part with the Safety Car Heating & Lighting Co.'s system, and in part by direct-acting steam pipes. Probably one of the latter will have the Williames system of pipes and couplings with a pump on the engine to exhaust the steam from the return pipe. It has 3 engines and 6 cars with the Martin.

New York & New England; 10 cars, Safety Car Heating & Lighting Co.'s system.

New York, New Haven & Hartford; Safety Car Heating & Lighting Co.'s system, and 1 engine with the Martin.

New York, Providence & Boston; 2 engines and 6 cars with the Martin and one train with the Safety Car Heating & Lighting system.

New York, Susquehanna & Western, Safety Car Heating & Lighting Co.

North Hudson County, 11 cars, Gold system.

Northern Pacific, 15 cars of Safety Heating & Lighting Co.

Ohio & Mississippi, Safety Car Heating & Lighting Co.

Providence, Warren & Bristol, 19 cars, Gold system.

Providence & Worcester has 10 engines and 18 cars equipped with the Martin.

Rome, Watertown & Ogdensburg, Safety Car Heating & Lighting Co.

Staten Island Rapid Transt, 39 cars, Gold system.

Suburban Rapid Transit, 20 cars, Gold system.

Wabash Western, Safety Car Heating & Lighting Co. ystem.

The following roads are considering the use of a continuous system, but have not adopted any, and are not known to have any in trial:

Buffalo, New York & Philadelphia; Fall Brook Coal Co.; Lehigh Valley; Minneapolis & St. Louis.

The following roads use the Baker, and generally they are satisfied that it is the best yet obtainable: Chicago & West Michigan; Cincinnati, New Orleans & Texas Pacific; Duluth, South Shore & Atlantic: Grand Trunk (Baker & Smith); Houston & Texas Central; Intercolonial (also Spears; will also try continuous systems); Minneapolis & St. Louis (also considering the Safety); Norfolk & Western; Rome, Watertown & Ogdensburg (will try the Safety also); Union Pacific.

The following roads use independent heaters but the style is not specified: Cleveland, Akron & Columbus; Lake Erie & Western; Milwaukee, Lake Shore & Western; Wilmington & Northern.

We hope shortly to be able to give further information on this subject.

Association of North American Railroad Superintendents.

The fall meeting of this association began at the Hotel Brunswick, New York City, on Monday, Oct. 10, about 25 members being present. Messrs. J. P. Hopson (New York, Rutland & Montreal) and E H. Brown (Nevada County Narrow Gauge) were elected members of the association. The proceedings were chiefly of an informal nature, as heretofore, the reports serving their main purpose in exciting extempore discussion.

The first business was reports of committees.

The Committee on Roadway asked for more time, and it was granted.

The report of the Committee on Machinery dwelt chiefly on the necessity for uniformity in passenger car couplers. The Savannah, Florida & Western has important connections which use the Miller, and others which use the Janney, and so has to use both. Removable drawheads are used, cars being supplied with both kinds, but the plan is not wholly satisfactory. Heads once in a while pull out from having in a hurry been put in without proper care, and the work sometimes disturbs passengers, especially at night. Extra Janney heads are sometimes used to fasten *over* the Miller hook, but these take up so much room that the platforms are too far apart. In the discussion it was said that the Miller uncouples from not being properly kept in place by the springs, but there was no evidence given as to other causes of difficulty with it, except the statement that on short reverse curves it would uncouple, even when in good order. The Providence, Warren & Bristol uses the Miller successfully on a curve of 211 ft. radius.

On the question of committing the Association to a standard, the vote stood 8 to 11, the majority voting against the Janney, not because it was not the best type, but because the Miller is so universally used in large sections of the country that action toward the adoption of any one standard is at present inexpedient.

This committee recommended that the Association adopt as its standard the standard axle, journal and journal box of the Master Car-Builders' Association, and this recommendation was adopted. It was voted that the action of the Association on this report of the Machinery Committee be communicated to the General Time Convention.

A member asking information as to the prevailing practice in the distribution of time-tables to employés, most of the gentlemen present explained their systems. About half of them require receipts in one form or another. Two get their responses by wire and one notifies the agents and others beforehand by wire. One sends out tables in large envelopes, having a form printed upon them, which being signed and returned to the division superintendent, constitutes the receipt. Four issue bulletins beforehand, notifying the men to get new tables on a certain date and one sends a notice by telegraph in addition to this. On one line the master of transportation goes personally over the road to deliver the tables, and on another a messenger is sent for the same purpose. Only two or three mentioned that they gave tables to Section Masters through the Supervisors or Division Road-masters, and those who take receipts have them sent direct to the Division Superintendent's office even when the tables are issued through an intermediate officer. One road sends tables by the local freight conductor, who is required to deliver personally to both track men and station agents. Mr. H. F. Royce, President of the Association, described the plan in use on his road (Chicago, Rock Island & Pacific). A bulletin is issued beforehand requiring all to supply themselves, and the Division Superintendents address the tables personally to each employé, who must return a receipt. These receipts are handed over to the trainmaster and he is charged to see that one is received from every employé who should have a table before proceeding to use the new issue. The subject was referred to the Committee on Transportation to be reported upon at the next meeting.

Mr. C. S. Gadsden, of the Charleston & Savannah, read a paper on the necessity of having through trains over several roads identified, so that their records could be conveniently referred to in subsequent investigations, and showing the great convenience of having these records compactly compiled. He exhibited some records of the fast mail train over the Atlantic coast line, which goes under the same number between Washington, D. C., and Tampa, Fla. A sample of this record is shown herewith. The portion shown is selected from the part of the month showing the poorest record, as better illustrating the manner of keeping the sheet. On many days the train runs the whole distance with nothing but dots on the record. These reports are of great convenience in settling questions with the mail authorities and others, and, being printed and distributed, have been a means of eliminating many delays formerly existing.

A question arising in regard to the fact that certain railroad officers who perform a superintendent's functions hold some other title, a member suggested that the Association try to bring about uniformity of titles throughout the country, but it seemed to be regarded as too great a task.

A motion having been made and carried that the President appoint new members on the Roadway Committee in place of absentees, the chair announced Messrs. Morford, Donnelly and C. A. Hammond.

The Committee on Frogs made no written report, but orally recommended that frogs should always be made of rails of the same pattern as those used in the track, and that those for the main track should always be of the spring rail variety. This report was adopted.

Mr. J. M. Brady exhibited to the members of the Association the working of the Smith portable rail saw, which saws through a 65-lb. steel rail in 15 minutes. The machine, standing about 18 inches high, is clamped to the rail and is worked by levers, the two men standing opposite each other the same as with a carpenter's cross-cut saw, but working the handles up and down, instead of pushing and pulling horizontally. The saw is a small sector of a circle, hung on a pivot, and is swung to and fro by the action of the levers, and the latter at the same time work the feeding apparatus which keeps the saw down to its work. The machine is in use on the New York Central road in New York city.

The E. Howard Clock Co., of Boston, exhibited its clocks with faces arranged for the 24 o'clock system. The figures are moved one at a time instead of all at once as in other styles of face. In the latter, a person reading the time at, say, 11 a. m., and counting forward, reads wrongly as the clock shows "two" where it should show "14;" and at 14 o'clock, if told to read Greenwich time, would, on counting five hours back (from 75th meridian) read 21 o'clock, when it should be 9. By the Howard system this is corrected, as one figure can be changed each hour, and anywhere from 1 to 12 hours behind the hour hand; thus, if changing six hours behind, it would at noon read, beginning at the top, 12, 13, 14, 15, 16, 17, 6, 7, 8, 9, 10, 11.

SECOND DAY.

The Transportation Committee, to which was referred Mr. Gadsden's paper on train records (read Monday), recommended that the ideas of the paper and the form of record be approved by the Association and the whole transmitted to the General Time Convention. The Association adopted the recommendation. The Transportation Committee made a report recommending a few changes in the rates for car service and trackage adopted by the association last April. The clause concerning the rate per mile for trains using another road's track in emergencies (50 cents a mile), is amended by adding a proviso that when the road granting the use of the track also provides engine and train crew the rate shall be 75 cents instead of 50. For cars lent temporarily to neighbors, as in case of an excursion or sudden press of traffic, the rate was changed to $4 per day for passenger and $3 for baggage cars, with 3 cents a mile for passenger and 2 for baggage as a mileage charge over owner's road from point where car may be, to point of delivery to the borrower.

The rule concerning trackage (demurrage) to be collected from consignees for use of freight cars was changed to read 50 cents a day, Sundays and holidays excepted, after 48 hours from the time the car shall be ready for unloading; a clause to this effect should be on bills of lading, and refunding should be allowed only by order of the superintendent, approved by the general manager. After some discussion this report was adopted. In the discussion reference was made to the fact that the exigencies of coal traffic at the smaller stations often made it good policy that the charge be not enforced, but the sense of the meeting seemed to be that such cases should be settled by reference to the general manager, who could refund. General freight agents would like to be

Atlantic Coast and West India Fast Mail Sheet for August, 1887, Train No. 14.

	Havana.	Key West.		Tampa.		Sanford.		Jacksonville.		Savannah.		Ashley Junc.		Wilmington.		Weldon.		Richmon'd.		Quantico.		Washington.
	L.	A.	L.	A.	L.	A.	L.	A.	L.	A.	L.	A.	L.	A.	L.	A.	L.	A.	L.	A.	L.	A.
Schedule time.....					p. m. 8 10	a. m 1.00	a. m. 1.15	a. m. 6.30	a. m 7.00	p. m. 12.06	p. m. 12.26	p. m. 4.43	p. m. 4.53	p. m. 11.45	p. m. 11.59	a. m. 4.25	a. m. 4.30	a. m 7.15	a. m 7.25	a. m. 10.00	a. m. 10.05	a. m 11.24
Date.																						
8.....				...	...	...	...	...	...	...	...	4.44	4.54	...	...							
9.....					10.35	3.40	3.58	7.25	7.40	12.55	1.15	...	...	11.47	12.03	...	...	...	...	...	...	...
10.....	P. 12.35	P. 7.56	P. 10.56		...	...	...	...	...	...	...	5.07	5.16	...	12.03	...	...	...	...	...	...	...
11.....				P. 4.05	...	...	...	...	...	...	12.30	4.56	5.05	...	12.02	...	...	...	...	...	...	...
12.....					...	...	...	...	7.05	...	12.28	4.45	4.56	12.06	12.14	...	...	...	...	...	...	...
13.....	P. 12.30	P. 7.40	P. 9.54		...	...	...	...	...	...	...	...	...	...	12.04	...	...	...	7.27	...	...	...
14.....				P. 3.79	...	...	...	...	...	12.10	12.28	...	...	...	12.02	...	...	...	...	10.02	10.09	...

REMARKS.

Time changes Central to Eastern at Ashley Junction.
* Denotes misconnection.

—— Donates change of schedule.
... Denotes train on time.

RECAPITULATION.

	On the run, lost min.	On the run, gained min.	Lost at transfer points, min.
South Florida	15	None.	None.
Jacksonville, Tampa & Key West	None.	242	137
Savannah, Florida & W	35	43	48
Charleston & Savannah	65	60	7
A. C. L. (Charleston Division)	47	94	17
A. C. L. (Weldon Division)	11	131	56
A. C. L (Richmond Division)	None.	43	26
Richmond, F. & Potomac	34	10	18
Baltimore & Potomac	1	26	6
Total	208	649	345

relieved of the responsibility of refunding to importunate customers, or rather deprived of the power to do it.

A desultory talk was had concerning track inspection, and the methods of several roads were described. The larger roads have to take one or two sleeping as well as dining cars along with their inspection train. It was said that the Cleveland, Columbus, Cincinnati & Indianapolis, and the Pittsburgh, Cincinnati & St. Louis were considering the adoption of some modifications of their present plans. Captain Fleming, of the Savannah, Florida & Western, whose carefully arranged system is familiar to the readers of the *Railroad Gazette*, deemed it undesirable to have a division road master act as critic of his brethren's divisions.

The Committee on Roadway presented a report embodying the following list of questions, which the Secretary was instructed to send to each member with a view to eliciting discussion at the next meeting:

1. What do you consider the best section of rail for (*a*) heavy freight traffic, (*b*) fast passenger traffic, (*c*) average conditions?
2. What do you consider the proper weight per yard for steel rails?
3. What is good practice in notching or drilling the flanges of rails?
4. What is the commonest cause of defects in or wearing of the ends of rails?
5. How do you prevent creeping rails, and how do you provide against trouble from expansion?
6. Give your views as to the best joint fastening for rails, including bolts, nuts and nut-locks?
7. Do you favor a thin steel bearing-plate to be used under the rail to prevent undue wearing of the tie?
8. What number of broken rails do you have, what time of year, and what are the causes so far as known?
9. What kind of ties is most durable? State the life of each and standard dimensions. Where are your ties grown?
10. Do you favor a plain or hollow-backed spike, and why?
11. What kind of ballast do you prefer, and what is the reason for your preference? What kind do you find it necessary to use?
12. What is the proper elevation for the outer rail of curves of different radius, and for different speeds? How much should the gauge be spread on curves?
13. Do you favor even or broken joints in laying track?
14. Where are track braces needed?
15. What thickness of shims do you use, how are they made and what measures are taken to make spikes in them hold?
16. How many cases of rail spreading have you had, and what are the causes?
17. What is your standard form and length of guard-rail opposite frogs?
18. How do you guard-rail your bridges?
19. What style of foot-guard do you use, and what is its durability?
20. What is the best pattern of switch and frog?
21. What is your plan of road inspection, and what system of premiums do you have in connection with it?
22. What are your rules concerning patrolmen and track-walkers?
23. How many section men per mile of single track, and how many per mile of double track do you have; how many in all, and how organized?
24. What is the annual cost per mile of single track for roadmen's wages, not including the cost of removing ice and snow?
25. What is the average cost per mile of single track for laying superstructure, including the distribution of material, track work, ballast, tamping, etc., but exclusive of preliminary grading?

The Executive Committee was instructed to confer with the Executive Committee of the General Time Convention regarding the relations of the respective bodies to each other. It was voted that the next meeting of the Association be held at St. Louis, Mo., on the third Wednesday in March next. This date was selected with a view to giving the Executive Committee time to prepare the action of the meeting for presentation to the Time Convention.

The Proposed Reorganization of the American Society of Civil Engineers.

A committee consisting of R. E. McMath, R. H. Thurston, W. H. Paine, Robert Moore and Fred Brooks was appointed at the summer convention of the American Society of Civil Engineers to report on a proposition to make a new class in the Society, viz.: Students.

The first four of the committee submitted a report at the last meeting of the Society, which was ordered printed and distributed, with the intention of bringing the proposed amendments up for adoption or rejection at the annual meeting in January next.

The report recommends, in substance, that the proposed grade of "students" be not established unless the Society at the same time raises the qualifications of the existing grades. Believing that the Society is ready to raise its standard for admission, the majority recommend the passage of certain amendments to the constitution, as follows:

Article XVI.—Active members of the Society to be divided into members, associate members and associates, associate members to have all rights of members excepting the right to hold office or vote on admission of members. Associates neither hold office nor vote.

"There shall also be a preparatory grade, to be designated students of the Society, who shall have the right to attend all meetings not strictly devoted to business and to use the library and rooms of the Society, under such regulations as the Board of Direction may adopt.

"They should have by right the transactions of the Society and the privilege of presenting papers and written discussions.

"Members of the class previously styled juniors shall, after March 7, 1888, be classed as associate members."

Article XVII. raises the time that a candidate for membership shall have served in his profession from seven to ten years for non-graduates and from five to seven for graduates. They must have been in charge of work for two years instead of one, and be not less than 30 years old.

An associate member shall be 24 years old and in actual practice for either five or two years.

The associate stands as at present, except that he shall not be less than 25 years old. "A student shall be one not less than 18 years of age, who is engaged in the study of engineering with the intent to become an engineer, and who has pursued that study at a technical school not less than one year, or who shall have been engaged in the study and practice of engineering under a competent engineer for not less than two years. A student shall not remain in that grade for more than seven years. If not elected to a higher grade his connection with the Society shall terminate at the end of seven years."

Article XVIII. provides that the student may be nominated by one person, either a member, associate member or associate, and elected by the Board of Direction.

It is proposed that the dues for associate members shall be the same as for associates, and for the students no entrance fee shall be charged, and the yearly dues shall be $10 for residents and $6 for non-residents per annum.

These proposed amendments are followed by a supplements setting forth that the classification now agrees with that adopted by the Institute of Civil Engineers. That the intention has been, in all the classes, to give a decided advantage to the graduates of technical schools. That additional weight and value to membership are given by the age limit and by increasing the experience necessary for membership, which also applies to the new grade of associate members. The students are not to be members of the Society, but subject to the Board of Direction for admonition and discipline.

Mr. Brooks' report agrees very closely with that of the majority, except that the classification of junior is retained form the students. They should be not less than 18 years old or more than 24, and their connection with the Society shall cease on arriving at the age of 27. A notice of their candidacy shall be sent to all juniors, and they may be expelled peremptorily by a majority of the Board of Direction. This minority report is accompanied by some remarks by Mr. Brooks to the effect that the appointment of the committee was the expression of a desire on the part of the Society to have younger men and more young men connected with it than at present; but that the designation student, however applicable in Great Britain, where young men as a rule commence their practice in a state of pupilage to established engineers, is not so applicable here, and would not be attractive to young engineers. Also, that as the Society can afford to strike off extra copies of its Transactions and sell them to the proposed additional class at little more than the cost of the paper, it is feasible to fix their annual assessment $4 or $5 below that of the present associates and juniors.

Mr. Brooks says further: "It has been alleged in public discussion of the proposed admission of young men to the Society that they could not with propriety be admitted to the presence of the punch-bowl after the meetings. That the prominence given to intoxicating beverages at its meetings has already hurt the Society in the opinion of valued members is unfortunately true; but a constitutional amendment purporting to be promotive of the growth of the Society is what is now under consideration; objections to it may exist not known to the undersigned, but seriously to allege as an objection that the meetings of the society must be unfit for the presence of young men would not be simply scandalous; it would be ridiculous."

The International Railroad Congress.

This body assembled at Milan, Sept. 17, in the Scala Theatre. It was opened by M. Saracco, Minister of Public Works. The officers elected for the present session were: M. Brioschi, President; Sir A. Hutchinson, and MM. De Bloch, Thommen, De Boros, Van Hasselt and Leon Say Vice-Presidents.

The Congress began its proceedings by discussing the reports on those questions which were sufficiently advanced to be presented. The first report taken up was that concerning the permanent way, stations, signals and rolling stock best adapted for the working of secondary lines. The Congress recommended the adoption for these lines of a narrow gauge, the use of signals, and especially distant signals; the employment of the train staff to control the movement of trains, and of the telephone for communication along the line. The system of watchmen at level crossings was considered as too expensive for lines of very light traffic. Cars with central aisles and end doors were recommended because of convenience of service. It was recommended also that the classes of passengers be reduced to two, or perhaps even to one, for the sake of economy in the construction and maintenance of cars. This subject was much discussed by the Congress, as being of very great economical importance.

The Congress adopted also a proposition to instruct the Central Bureau to present at the next session a scheme for collecting and preparing international statistics, to make possible a more enlightened study of earnings and operating expenses.

The question of the use of metallic cross ties was put off for further study, in view of the experiments which are now going on on many great lines. A report was presented and adopted upon methods of balancing driving wheels for fast trains, upon the best methods of securing car bodies of trucks and the practical means of reducing the weight on cars.

The subjects submitted to the meeting are: (1) Metal sleepers and steel bridges; maintenance of permanent way; provisions for dealing with snow; conditions and cost of maintaining lines with exceptionally heavy traffic. (2) The best utilization of locomotives; improvement of passenger stock; construction of locomotives; lubrication and premiums for economy; continuous brakes; lighting and heating of carriages. (3) The control or checking of passengers; passenger trains; goods traffic; minor lines; shunting; lighting of stations. (4) *Employés*, their recruiting and remuneration; benefit societies; dues and taxes; international relations; technical information; and (5) questions specially relating to secondary lines.

Iron Centring for Tunnels.

We give herewith illustrations of types of tunnel centring made of rails. They are taken from the *Annales des Traveaux Publics*. Mr. Drinker, in his "Tunneling," devotes a chapter to the subject of iron centres, and gives

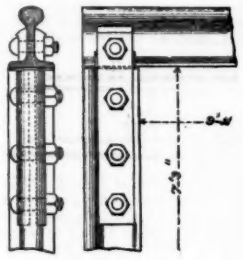


Fig. 1.

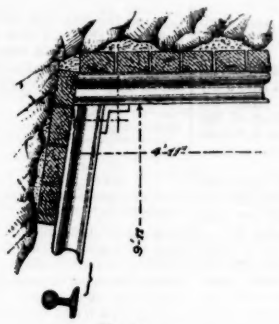


Fig. 2.

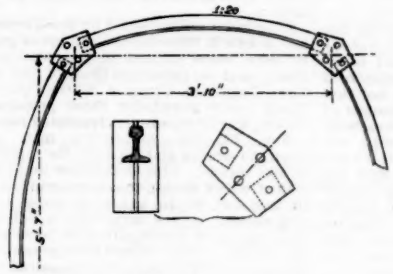


Fig. 3.

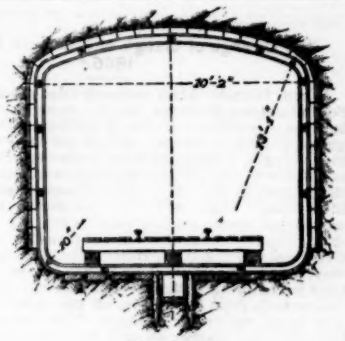


Fig. 4.

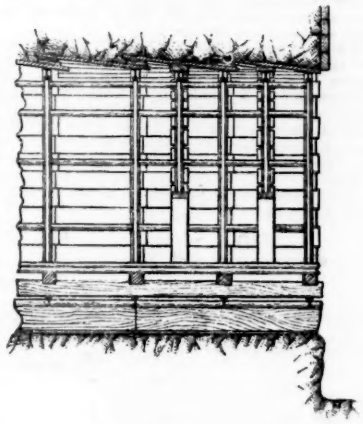


Fig. 5.

Fig. 6.

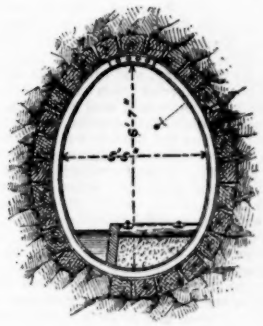


Fig. 7.

IRON CENTRING FOR TUNNELS.

various examples, amongst others the centring used by Telford in the Harecastle tunnel in 1824, and that used in the Erie tunnel through the Bergen hill. The *Annales* states that although the system of iron centring dates from 1856, it was not used until its application in the Nalusen tunnel in Germany. Old rails were also used in 1862 in the Mont Cenis tunnel. They do not seem to have been bent, but vertical supports of iron, 2½ in. square, carried horizontal rafters of old rails, on which was placed a ceiling of planks. The system was adopted there for economy of space, and Mr. Borelli, the resident engineer at Bardonnèche was so well satisfied with it that he was inclined to recommend it for tunnels generally. Mr. Drinker, after considering at some length the use of iron centring, concludes that in most cases in American practice it will not pay, notwithstanding its advantages in economy of space, accuracy, durability and strength. Yet he suggests that even now it may be well worth a trial by contractors under conditions where great weight is to be borne, or the most absolute rigidity is required or economy of space is of great importance.

The accuracy with which the iron centring can be adapted to the cross-section of the tunnel is also worth considering. In the recent German practice the frames are made, according to the circumstances, of rails bent and clamped at the joints or with eye-beams or with channel bars.

In figs. 1 and 2 are represented iron frames used in tunnels of rectangular or trapezoidal cross section. Figs. 4 and 5 show in transverse and longitudinal section the galleries of the Altembourg tunnel, and figs. 6 and 7 show centring used in the Harz mines. In the district of Saarbruck there are in use no less than 27,760 iron centres, weighing altogether nearly 3,000 tons, and having cost about $116,000.

The Roadmasters' Association of America.

The fifth annual convention of this body was called to order by President J. W. Craig at 11:30 a. m. the 11th inst. Some three score members listened to his remarks, and before evening over 100 were in attendance. There was aarge representation from the South.

Mr. Craig outlined briefly the object of the gathering and congratulated the organization upon its growth and prosperity. He was proud to be the chairman of the body, and asked those present to assist him in conducting the business in hand with dispatch. He closed by introducing Mr. Charles Latimer, Resident Engineer of the New York, Pennsylvania & Ohio, who delivered the opening address, which we give at considerable length. Mr. Latimer said:

It gives me the greatest satisfaction to look into the faces of so many friends whom I know so well, and to greet such a representation of the Roadmasters of America. There are at the present time in our land about 150,000 miles of railroad, and upon these roads there must be not less than 1,500 to 2,000 roadmasters. We all know what a serious thing it is for you to be absent from your duties at any time, and it is a high compliment to you that the managers so feel the importance of this convention as to give you leave of absence. * * * You represent for the most part men who, from sheer force of adaptability of fitness, education and strength of character, have been raised to the position of guardians of the track of our great railway system; men who did not crawl in through the cabin windows, but came through the hawse hole, *i. e.*, not by favor, but by work, selected for position because it was necessary for the safety of the traveling public that the most capable should be appointed. Whatever favoritism may do to advance others, the only touchstone for the position of roadmaster must be *fitness*, so that he stands independent; he can say, "I am roadmaster because I was faithful and worthy of my place." Only railroad men can understand the serious responsibility of the position, and as one of you, with responsibilities resting on me, I fully sympathize with you in all in your aims for improvement and true advancement exhibited by this gathering, and do most heartily welcome you to the Forest City of America.

The discussion of all questions concerning track inventions and best methods is essential; and last, but most important of all, our attention must be directed to the handling of human forces to the labor question, the vital issue of our day. What do the knowledge and intelligence of the roadmaster avail unless he understands the art of governing and the knowledge to select his men? When I use the term governing, I do so with a sigh of regret that man requires to be governed at all, for the greater the intelligence of labor, the less it requires to be governed.

More time is lost and more money squandered on account of the lack of what is called governing power than from any other cause.

How shall we describe this governing power? It is not in the sharp, dictatorial tone in which many issue their commands; it is not in the pompous, consequential manner by which some endeavor to impress their authority upon their fellows when in power. You will, I feel sure, agree with me that the highest order of governing power is derived from the fact that its possessor is imbued with the importance of his work, and taking a profound interest in it, can communicate all his earnestness, all his zeal, to those who under Providence occupy subordinate positions to him. There must be the true sympathy of co-workers between the chief and those who aid him: in fact, your governor must be one who has not only a brain to devise and direct, but a heart to appreciate the efforts of those to whom he confides the practical details of his administration. The law of love is the true law, the only foundation of true government—love of our fellow-men, love of our work, and, above all, love of our Creator to whom we must look for guidance in the difficult crises to which we are frequently liable.

You are all men controlling large numbers of workers whose positions in many cases are absolutely dependent upon your word. A scratch of a pen often sends a poor man to a weeping wife and children who look for support to the daily work of the husband and father on the track under your charge. It sometimes happens that you receive an order against which your common sense revolts. In your judgment it involves the safety of the people traveling on your road. With a heavy heart you go to your office to discharge some of your oldest and most faithful men. How you need a prayer to guide you in selecting those whom you must drop from your list. I have been obliged sometimes to give such orders. It is well for us if we retain our manhood, our humanity, our sympathies, and do not become cold, heartless, unfeeling, mere railroad machines. Brother railroad men, keep your hearts soft. Railroad machines are expected only to do what they are told and to look to superior beings to do their thinking for them. * * *

Those of you who have read the printed proceedings of the Roadmasters' meetings on the Atlantic & Great Western, or the New York, Pennsylvania & Ohio, will notice the gradual changes in the methods of thought of our roadmasters. In our first meeting I found that some of our members were diffident about expressing their opinions, and in response to questions would say, "I agree with Mr. Latimer." I made a point right there, and said, "I do not wish any roadmaster to quote me for his opinion, however flattering it may be to have this deference to my judgment. I beg you to give me your unbiassed, independent thought; then, when I hear your opinions, I shall know that I have something valuable, the earnest reasoning of a strong, intelligent man." How thankfully I now look back to the effect of these few words. I had the support of twelve wise roadmasters, each thinking for himself, giving his heart and soul to his work. They were a power and support to me in my duties and a blessing to the road. I can review with inexpressible satisfaction this experience of years of association with the roadmasters of the old Atlantic & Great Western. I delight to think of our meetings and honor these men as the best types of disinterested sons of toil in one of the most arduous, most honorable and most responsible positions in the world. Our methods of government were tried during more than ten years under the general management of one of the wisest railroad men of the country, Mr. Devereux, whose loss we lament. They had for their base the theory that the best government is that under which men are least governed. Each man, from highest to lowest, as it is the fashion to express it, had his due meed of honor, praise and credit. Under its admirable working there was perfect harmony in the whole force.

Knowing himself, respected and honored in the faithful discharge of duty, each man was true to his trust—the section foreman, the section man, always vigilant, through the dreary nights of wintry sleet and snow, of flood and fire, his light flashing out in the face of engineer and trainman to calm and strengthen them while the locomotive dashed blindly over the road in darkness that might be felt, 60 miles and more an hour, the precious freight of humanity depending upon one poor (but how rich) knight of pick and shovel when one single mistake from him might send many souls to eternity. We may all be pardoned for a thrill of exultation, tempered we hope by a gratitude to a divine power, when we know that in all these 10 years of organized toil over 600 miles of road not one passenger, not a single employé, was killed from fault of track or trackman. Many of these earnest workers have gone unrewarded in this life, looked upon with little more consideration than mere machinery, but sure of finding the greeting "Well done, good and faithful servant," when their pilgrimage is over.

We need but make one illustration of responsibility of the track force by referring to a late accident upon one of the railroads of a more western state, where, by neglect of a section force, 500 men, women and children were killed or wounded in a moment. * * *

I have said that these men were faithful; let me point to your branch of the railroad service in these days of agitation, such as has not shaken the earth in the memory of modern times, as consisting of men pre-eminently faithful. We all remember 1877, the year of the railroad earthquake, as we may call it. While the whole transportation departments of several great systems threw down their tools and struck, the trackmen remained steadfast and no manner of intimidation nor persuasions could move them from their allegiance to their duty. They said: "The track is the foundation of the whole structure, and if that goes what will become of the structure?" A remarkable situation was presented subsequently with circumstances almost the same as those of 1877. Your forces have remained true and firm to their trust amid many grievances. Your counsel must have been good, your influence strong and your loyalty tried to the uttermost. Your conservatism is most praiseworthy, most thankworthy, as we look upon the millions spent to override the laws of our country.

Mr. Latimer followed with an expression of his belief in and sympathy with such labor organizations as have for their purpose mutual aid, improvement and support. He also stated very strongly and unreservedly his belief that the Government should own the railroads and telegraphs. Continuing, he said:

When I had the honor of addressing you some years ago, I touched upon the subject of one great demoralizing influence in railroad work, viz., the wholesale desecration of the Sabbath in this country by railroad companies. I feel that no opportunity should be lost of reiterating the great importance of obtaining the complete day of rest to which you are entitled. How this great wrong is to be rectified has been a subject occupying my attention for years, and I have put forth every effort in my power to check the evil in the work over which I have had charge. * * * Now we have a noble set of men as managers of our railroads in this country, and we may say the same of employés generally, from highest to lowest, but I must believe from personal observation that your hope of escape from this enthralment depends not upon managers, but upon yourselves. You have the right to your rest. It is a covenant between God and his people. Assert your right by petition and there will not be a right-minded manager of a railroad in the country who will not hail it with satisfaction, and grant it without loss of time and go with you. * * *

Trusting that your discussions and actions may be harmonious, valuable, creditable alike to yourselves and honorable to the roads you represent, I wish you happiness here and full fruition for your work hereafter.

Mr. Latimer was frequently interrupted by applause, and at the conclusion President Craig, in a neat speech, thanked him on behalf of the Association, which expression of sentiment was unqualifiedly approved by a long and hearty cheer.

The convention then adjourned until 2 p. m.

The Change of Gauge of Southern Railroads in 1886.*

When Horatio Allen recommended a 5-ft. gauge for the South Carolina Railroad, he little thought that half a century later an expenditure of over a million dollars would be required to undo his work. He did not expect an extension of the iron rails, within that time, from ocean to ocean, nor that necessities would arise for running cars from one extreme of the country to the other. His successors, in later years, were little wiser. Time, however, has shown that prompt and economical transportation requires that our car, once loaded, shall go to its destination without transfer. To this end, the 6-ft. lines attempted to extend their wide gauges to distant centres of trade; while the 4 ft. 8½ in. and 4 ft. 10 in. gauges tried to compromise their troubles by changing the tread of their wheels from the 3½ in. of the early lines to 5 in., that they might run on both gauges. This was not altogether satisfactory, and another attempt was made to harmonize matters by the use of a compromise gauge of 4 ft. 9¼ in. This did better, and in time the 4 ft. 10 in. or "Ohio" gauge, was changed to this or its successor, the 4 ft. 9 in. The 5 ft. 6 in. gauge became a thing of the past, and the 6 ft. either became "standard" or laid a third rail, so that either "wide" or "narrow" trains could be run, and all equipment be kept in use until it was narrowed, when the third rail could be taken up. It became possible to run a car from the Atlantic to the Pacific, north of the Ohio River and west of the Mississippi River. South of the Ohio and east of the Mississippi, however, the universal gauge, save a few roads in Virginia, was 5 ft. Interchanges of cars were not thought necessary, and all freight to and from this section had to be transferred from car to car. This burden was realized by both railroads and shippers, and arrangements were made to exchange trucks, till not a prominent point could be found on the border without its "hoist" and acres of extra trucks. This was expensive, both in time and "plant," and a change of gauge, which would do away with these "hoists" and the time and labor required to operate them began to be talked of. Few, however, had the courage to think of it as a thing of the near future.

The Illinois Central Railroad was the first line east of the Mississippi to meet the question and make its southern end conform in gauge to its northern, which it did in 1884, giving a continuous 4 ft. 8½ in. line from New Orleans to Chicago. Under the pressure of competition, the Mobile & Ohio Railroad followed, and in July, 1885, changed to 4 ft. 8½ in. The most direct competitors of the Mobile & Ohio Railroad, the Louisville & Nashville and Cincinnati Southern systems, saw that they, too, must change, or be at a disadvantage, and determined so to do. Other large systems realized that they could delay no longer, but must move with the Louisville & Nashville and Cincinnati Southern. The smaller roads had no choice in the matter, but must join the ranks.

At a meeting of the Executive Committee of the Southern Railway and Steamship Association (presidents of the various lines) held in the summer of 1885, a committee of general managers of the principal lines was appointed to take up the matter, formulate plans and fix dates, that there might be harmonious working and the least possible delay and discomfort to the public. This committee met in New York in October, 1885, but nothing like a general or satisfactory discussion was had. The more the managers looked into the matter, the more they were impressed with its magnitude, and the need for co-operation. Our chairman was requested to call a meeting of the managers of all lines interested, with the request that the heads of their Transportation, Machinery and Maintenance of Way departments be present to aid in the consideration of the question. This convention was held at Atlanta, Ga., Feb. 2 and 3, 1886, with 70 representatives, of various grades, of 30 roads. Tuesday, June 1, was fixed upon as the day for the general change, though some 6 or 8 roads, for local reasons, were to change on Monday, May 31. It was also agreed that branch lines might be changed at such other times as best suited the owners, the general change being so conducted as to best promote the interests of the through lines. Committees were appointed on Transportation, Roadway and Machinery, to discuss in detail matters pertaining to the various departments and to report to the convention for final action.

The matter of the proper gauge to which we should change was taken up by the convention itself, and a lengthy discussion followed. It was urged by one important line, whose business was mostly with Northwestern roads, that 4 ft. 8½ in. was the true gauge to be used. The greater parts of the roads changing, however, had their largest interchange of business with the east and northeast, and consequently with the Pennsylvania Railroad system. There must necessarily be a large interchange of cars with that road, and it would follow that the gauge used should readily admit Pennsylvania Railroad cars, and that our cars must be acceptable to that road. It is true that the Pennsylvania Railroad cars do run on the Northwestern, or 4 ft 8½ in. roads; but it was the experience of several who had worked both gauges, that to haul a given number of cars upon a 4 ft. 8½ in. track required more power than upon a 4 ft. 9 in. track, because of the greater friction between the wheels and the rails; the flanges in one case clearing the rail by three-fourths of an inch, while in the other the clearance is one-fourth of an inch, and sometimes less, especially when the track men have the track gauged a little too close; not an uncommon thing to find. Again it is not an unusual thing for a wheel to be carelessly put on, and be too wide. It was the writer's experience, a few years ago, while connected with a 4 ft. 8½ in. road, to send some Pittsburgh, Ft. Wayne & Chicago cars to the Mississippi River loaded. They were undoubtedly a little too wide and the track in the yard where they went was a little too narrow. The inspector found something wrong, and actually took the trucks out from under the cars and replaced them with narrow trucks, upon which he sent the cars to Chicago, while he loaded the wide trucks upon flats and returned them home in that way. One road in Ohio, formerly a 4 ft. 10 in. "Ohio" gauge, changed to 4 ft. 8½ in., and after a few months experience again changed to 4 ft. 9 in., and found that it was freed from many trials due to small clearance between flange and rail. It was at last decided that we would make 4 ft. 9 in. our gauge. This discussion brought out a special committee on wheel gauge who were to take up that question in connection with other roads of both gauges and report at an adjourned meeting on the 16th of February.

The Transportation Committee reported upon the transportation feature of the problem, which chiefly pertained to the handling of loaded and the return of foreign cars prior to the change, in order that each road might have only its own cars on the day of change, or the fewest possible cars of other roads.

The Machinery Committee treated upon the matter of changing cars from a general stand-point, in order that the work upon those away from home, or upon foreign roads, should be done in the manner desired by the road owning the cars. Beyond that, they left each road to do its own work in its own way.

The Committee on Roadway went more into detail, and based upon the experiences of the Mobile & Ohio, and such other information as they could obtain, reported as follows:

[The instructions issued by the General Superintendent of the Mobile & Ohio for the change of gauge on that line July 8, 1885, were printed in the *Railroad Gazette* May 14, 1886, and we published those of the Superintendent of the East Tennessee, Virginia & Georgia in 1886, June 4, 1886. These cover essentially those prepared by the Committee, which, therefore, are not reprinted here.—Ed.]

Feb. 16, the convention met, pursuant to adjournment, to receive and consider the report of the Committee on Wheel Gauge. This Committee sent circulars, upon the subject of wheel gauge, to a large number of roads, both 4 ft. 9 in. and 4 ft. 8½ in. gauge, in order to get their ideas and experience. At the same time a sub-committee was started upon a tour of investigation, to learn what they could upon the matter. They visited a large number of roads and saw the practical workings, and consulted with the most experienced car-builders in the country. After a careful examination of the information thus obtained the Committee reported:

"We recommend that 4 ft. 5⅜ in., allowing variations of ⅛ of an inch either way, be adopted as a standard gauge between flanges, and further recommend that the limit gauge of the Pennsylvania Railroad be adopted, that is, the smallest distance between flanges be 4 ft. 5 in., and the smallest distance from out to out of the tread of wheel be 5 ft. 4 in. Any wheels measuring less than allowed by these limits to be rejected."

This was exactly what the Master Car-Builders had fixed upon as the proper gauge for wheels, but which had only stood as a recommendation, never having been accepted as a standard by any roads. The following statement shows the gauge, distance between flanges and lateral play of a number of large systems:

Gauge track.		Name of road.	Distance between flanges. Ft.	In.	Lateral play In.
4	9	Pennsylvania	4	5½	¾
4	8½	Illinois Central	4	5⅝	⅜
4	8½	C., B. & Q.	4	5⅝	½
4	8½	L., N. A. & C.	4	5⅝	..
4	8½	N. Y. C. & H. R. R.	4	5⅝	.
4	8½	Missouri Pacific	4	5½	1/16
4	8½	L. S. & M. S.	4	5¼	¾
4	9	Rich., Fed. & P.	4	5⅜	¾
4	8½	Balt & Ohio	4	8¼	1/16
4	8½	C., M. & St. P.	4	5⅛	⅝
4	8½	C. & N. W.	4	5⅜	⅝
4	8½	St. P., M. & M.	4	5⅛	¾
4	9	Ches. & Ohio	4	5½	¾
4	8¾	Pitts. & L. E.	4	5½	¼

It will be seen that the report was based upon the practice of many roads, and would undoubtedly give satisfaction to all. It was adopted by the convention.

The general plan has now been blocked out, and individual work could commence with reasonable assurance that it would be in harmony with that of other roads. The various officers had studied the problem to some extent before the meeting, and had worked out many details in their own minds. They were thus enabled to compare notes, and avail themselves of the thoughts of others, and gain much valuable information. Some prepared and printed very elaborate instructions, intending to cover the minutest detail of the work, so nobody could possibly err, only to find that the practical man on the track or in the shop discerned "snags" unthought of by the formulator of the instructions, and also found ways to overcome the difficulties, and in many cases was able to do his work in a better and cheaper way than was pointed out in the instructions. The more general way was to print and issue only the general instructions, leaving much to department heads to work out according to the conditions surrounding them. Frequent and full personal consultations were found to be useful. The work was of an extent and character, all things considered, never before undertaken, and must be done at the time selected. There would be no chance to wait and see what others did, or to correct mistakes; it must be done and the public served. The work of preparation was spread over several months, and in fact was much more of a problem than the mere moving of the one rail three inches. The engines and cars were of varied construction and conditions, and the facilities varied with the various roads and localities. A rule which would work well in one place, would not of necessity be the best in another. A process which would be good in one place, might not be the most economical in another. So the officers of each road tried to look at their problems, with their surroundings, and decide for themselves how much of the general plan they could follow.

I give briefly some of the plans and methods in both track and machinery matters, showing how details were handled. While several roads had changed gauge, the conditions varied much from these we now had to meet. In former cases there were plenty of neighbors or connections, from whom cars could be borrowed to keep their traffic moving, while in ours everybody had to look out for himself, and could not help his neighbor if he would. We must take care of our traffic and change our cars at the same time. To do this we must withdraw a part of our equipment from service, and change it prior to the change of the track, giving us something to use as soon as the track was changed. Necessarily, this would inconvenience the public somewhat; but there was no other way out of the trouble, though a loss of earnings would follow.

It was argued by some that the proper way would be to provide entire new sets of wheels and axles, so that, at the change, the least possible time would be used in the transfer. The general idea, however, was that it would be very expensive and unwise. When we consider that with 13,000 miles of main track and 1,500 miles of side track, there were 1,800 engines and 40,000 cars, we see the great cost of that plan, 327,000 new wheels and 163,000 axles could not be thought of, even if we did have nearly as many wheels and axles left over to be used in repairs. We must withdraw our cars, and if possible get half of them changed before the first of June. Cars so changed would be "parked" upon tracks, which would be prepared for the purpose, near the shops where the change was made. When the day of change came it would be necessary to gather in all the remaining broad gauge cars at the same points and "park" them upon these tracks, unless the road should be fortunate enough to have a large surplus of broad gauge tracks that were not needed for traffic. Very few Southern roads had this, and the extra tracks were, as a rule, laid. A system with 5,000 cars would need about 30 miles.

Just how much would be needed at each point was a matter of conjecture, as no one could tell in advance how many cars would be changed at any one point, or how many broad gauge cars would be hauled there at the last minute. Storage tracks as a rule could not be built very near the shops where the change of trucks were made, so that tracks had to be laid connecting them with the shop tracks.

The shop tracks were so arranged that both wide and narrow gauge trucks would run upon them. This was, as a rule, done by putting some guard rails inside the 5-ft. track, 4 ft. 5 in. out to out, so that the tread of a wheel of the narrow truck would be kept on the rail of the 5-ft. track, fig. 1. Some were laid with the outer rails 4 ft. 11¼ in. apart, and without guard rail. This, however, did not give good satisfaction, as the bearing surface was so small that a slight imperfection in the rail, or a curve that let the wheel run to one side, would cause a wheel to drop in and give trouble and delay. The tracks from storage yards to shops were sometimes laid with a guard rail, fig. 1, and at others with two

FIG. 1.

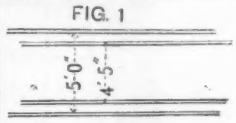
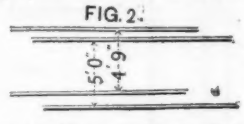


FIG. 2.



separate tracks on the same ties, as shown in fig. 2. This last was most satisfactory. Several ingenious devices were used to switch from one track to another, all temporary in character and inexpensive. Expensive frogs in some way were avoided, where two tracks or rails were crossed and compound frogs ordinarily used.

In changes heretofore made full sets of bridles for switches had in some cases been provided and "Wharton" switches thrown out, plain stub switches being put in their places. This seemed expensive, and would take up much valuable time on the day of change.

We have various kinds of bridles. The old-fashioned one for the stub switch, that clasped the base of the rail, as shown in fig. 3, was cut near its centre and had one end lengthened: each part being at least 2 ft. 9 in. long. Three holes were either punched or drilled through the bars near the end, the outer one 2 ft. 7½ in. from the inside of the rail head, the next one 3 in. inside of that. This made the bars all alike, and no care had to be used to pick "rights" and "lefts."

These were put on the 5-foot gauge by placing the outer hole of one bar over the second hole in the other; a bolt was

FIG. 3.

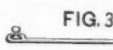


FIG. 5.

FIG. 4

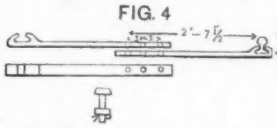
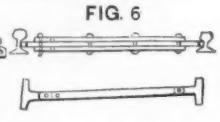


FIG. 6



then put through, a nut put on the bolt, and a spring cotter put in a hole which had been drilled through the bolt. Another bolt through the other holes, and the bar was secure. On the day of change the bolts were easily removed, the bars moved 3 in., the bolts replaced, and our track was 4 ft. 9 in. Fig. 4 shows the bars as changed and ready to be put together. Fig. 5 shows a bar which took hold of the flange of the switch rail, treated in the same way. Fig. 6 shows another kind, and the manner of its treatment is readily seen by the sketch. A hole is drilled 3 in. back from the one through which the original rivet or bolt was put.

With the "Wharton" there was more trouble, as the bars could not easily be removed to be prepared for change. It was found however, that a casting could be made that could

FIG. 7

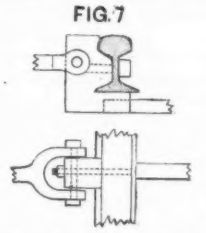
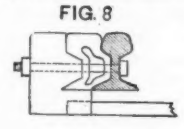


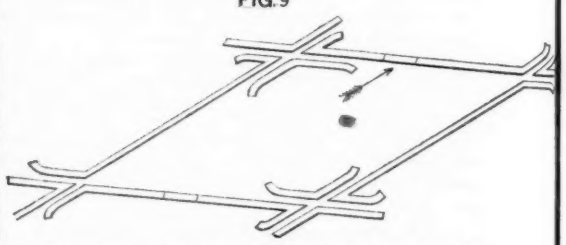
FIG. 8



be placed behind the elevated rail, which would hold it in 3 inches securely, a longer bolt being needed. Figs. 7 and 8 show this so plainly that no further description is needed. Five each of these bolts and castings were needed for each switch. The safety throw bar was simply disconnected to be lengthened and replaced at leisure.

Crossings were prepared by cutting out at the centre the

FIG. 9



requisite length, and then keeping the piece in place by splice bars till the day of change, when the cut pieces were taken out and one side moved up to proper gauge, see fig. 9.

(TO BE CONTINUED.)

* By C. H. Hudson, member of the Western Society of Engineers, reprinted from the *Journal of the Association of Engineering Societies.*

An Interesting Morsel of Railroad History.

The smallest of American republics, Costa Rica, owns and controls a railroad, and the history of its management, as given in the current number of *Harper's Magazine*, is highly interesting. The negotiation of a loan for its construction caused a revolution, a successful revolution, originated by an English banking house which had failed to obtain the opportunity to exploit it. The new President, who had never seen a locomotive, adopted the remarkable method of constructing the line from its interior terminus, transporting over the mountains piecemeal in ox carts engines, rails and supplies from the natural point of departure on the seaboard. This eccentric policy, while it exhausted the loan before 40 miles of road were built, was admirably adapted to overcome the prejudices of competing lines of ox carts, and therefore politically justifiable.

The road is now "under the direction of a native engineer, who has never been outside the boundaries of the republic and never saw any railroad but this * * * a man of genius and practical ability, and, it allowed to have his way, it might be a paying enterprise. But the government uses it as a political machine, employs a great many superfluous and incompetent men—mostly the relatives and defendents of influential politicians—carries passengers and freight on credit, and does many other foolish things that make profits

impossible and cause a large deficiency, to be made up by taxation, each year. On every train of three cars, one for baggage and two for passengers, are 13 men—a conductor, an engineer, a fireman, two ticket takers, two brakemen for each car, two baggagemen. Passengers known to station agents can obtain tickets on credit, and shippers are allowed from 30 to 60 days on freight charges. In short the railroad policy is adapted to the "sentiments of the people."

This is certainly a remarkable, if rather small, illustration of the effect of the elective franchise upon railroad policy, when the state controls the railroads. The oft-quoted German experience with state railroads has been obtained under a military despotism; but here we have state ownership under republican institutions, rather inactive ones, to be sure, but nevertheless not so very unlike our own in form and policy. We commend Costa Rica's railroad policy to the thoughtful consideration of all those good republicans and earnest democrats who are not satisfied with anything but "facts."

The Cowell Coupler—Correction.

In the letter of Mr. Herrick, published last week, there was a typographical error which probably misled readers as to Mr. Herrick's meaning. His statement should have been printed as follows: "The Cowell with side buffer, which is generally preferred, does *not* work with the Miller. The Cowell with buffer above *does* work with the Miller and does not touch the draught timbers." The italicised *not* was omitted in the letter as printed.

The Time Convention.

The fall meeting of the General Time Convention was held in New York City, Oct. 12. There were about 75 members present, representing 60 roads. The business was completed in a single day, the discussion on the uniform code being very brief, and the other matters being referred to committees to be considered and reported upon at a future meeting. The date fixed upon for the fall change of time table is Nov. 13.

The report of the Committee on Uniform Rules was as follows:

The following subjects were referred to the Committee at the last meeting:

1. The definition of the duties and authority of a pilot, and the circumstances under which a train should be provided with one. 2. In regard to using a distinctive whistle signal for calling in flagmen from different directions. 3. In regard to the use of a combination of red and white lights on the rear end of a train.

Your Committee would respectfully report as follows:

1. A pilot is a person placed on a train when in the judgment of the proper authority an engineman or conductor, or both, are unacquainted with the physical characteristics or running rules of the road, or portion of the road over which the train is to be moved. The responsibility of a pilot is the same as the responsibility of the engineman or conductor, or both, whom he pilots. The Committee does not deem it advisable to include this definition in the code of standard rules, believing that it more properly belongs among the rules defining the duties of classes of employés, such as conductors, enginemen, etc. 2. It is recommended that Rule No. 45 be amended to read as follows: "Four *long* blasts of the whistle (thus — — — —) is the signal to call in a flagman from the west or south. Four *long* followed by one *short* blast of the whistle (thus — — — — —) is the signal to call in a flagman from the east or north."

The Committee find themselves unable to formulate a rule governing the calling of flagmen on roads having three or more tracks, and suggest the above to the Convention, believing that it can be safely used both on single and double track, and permits the signals to be further increased to suit roads having more than two tracks.

3. After examining the results of experiments made on the Wabash and on the Pennsylvania the committee unanimously concludes that red lights alone are better than a combination of red and white lights for marking the rear end of a train. Both sets of experiments, conducted independently of each other, brought out the fact that the white light somewhat obscured the red; that is to say, the red disappears from view sooner when shown in connection with the white than when shown alone, the red being absorbed by the white. It was also suggested to the Committee that the use of white lights in connection with red lights for rear end signals would interfere with the semaphore bracket signals on which many of the displays would be in the same relative position as when a white light or lights were used in connection with one or more red lights on the rear end of a train.

The Committee having re-examined the train rules in connection with the suggestions and criticisms that up to this time have come to its knowledge, it was the unanimous opinion of its members that as the suggestions and criticisms presented involved no change in the principles of said rules, nor in any essential manner made the meaning any plainer, it was inexpedient to make any change other than in Rule 16, which it suggests should read as follows:

"16. Each conductor and engineman must have a reliable watch, which has been examined and certified to on the form attached hereto by a responsible watchmaker, and must file such certificate with the proper designated officer before he is allowed to take charge of a train or engine. Watches must be examined and certificates renewed every six months." (The changes are merely verbal.)

The Committee also recommends that all roads shall adhere to the rule numbers as given in the Standard Rules; that numbers 1 to 199, inclusive, be reserved for "Train Rules," and numbers 500 to 599, inclusive, shall be reserved for the "Rules Governing the Movement of Trains by Telegraphic Orders." That where additional rules are necessary to cover local matters, they shall either be designated by a suffix (as 110*a*, or 110*b*, etc.) or by numbers from 200 to 499 or above 599. The object of the Committee in this recommendation is to maintain the identity and integrity of each individual rule, so that the number and the text of each Standard Rule shall be the same on every road.

In response to the request of the Committee a number of criticisms and suggestions respecting the "Rules for the Movement of Trains by Telegraphic Orders" were received, many of them the result of several months experience in the actual working of the code as previously adopted. The Committee has in consequence made some amendments * * * as follows:

Rules 526 and 527 have been taken from their former position and inserted following 514; they thus become 515 and 516 and the numbers of the rules following have been changed accordingly. In rule 524 (*B*), the last six lines are expunged. Rule 525 is verbally improved, now reading: "They will record the time of arrival of trains," etc. Under Form E the following note is added: "This form of order must not be used when Form A can be used." Under Form F the form for discontinuing a section now reads (example): *Eng. 85 is annulled as, etc.* Under Form G, example 2 reads: "Which shall be for this train a supplement," etc.

Under form G (2) the wording is made "* * * on the following schedule, which is a supplement to time-table No. —," and the same in the example. The note after example of form G (2) is made to read, "example (2) creates a regular train, and the specified meeting and passing points are to be regarded as if designated in the same manner as on the time-table. Such trains will be governed by all rules which affect regular trains." Under form H the word "entirely" is expunged from the first note. In example (*b*) under form H "or to-day" is expunged. Under Form L. the requirement that the annulled order must be recited in full is struck out, and the next paragraph is made to read: "If an order which is to be annulled has not been delivered to a train, the annulling order will be addressed to the operator, who will destroy all copies of the order annulled but his own, and write on that," etc. Under the example of a form of a superseding order is added the note, "An order which includes more than one specified movement must not be superseded."

This report was adopted and no further alterations were made, except that in the explanation of the example of order under form L the wording was made as follows: "And when the order is not transmitted simultaneously to all concerned, it must be sent to the point at which that train (the train to which rights had been given) has received it and the required response first given before the order is sent for the other trains:" and Rule 21, beginning at the third paragraph, was made to read as follows:

Both the arriving and leaving time of a train are in **full-faced type** when both are meeting or passing times, or when one or more other trains are to meet or pass it between those times.

When more than one train is to meet or pass a train at any point, attention is called to it by ——.

NOTE.—The Committee recommends that each company adopt such method as it may prefer for filling the above blank.

The convention then by a vote of 58 to 2 finally adopted the code of rules for the movement of trains by telegraphic orders and discharged the Committee with the following vote of thanks:

Resolved, That the thanks of the General Time Convention are due to the Committee which has with such great ability developed from a mass of discordant rules, practices and preconceptions the document which has just been adopted by this body and which will hereafter doubtless govern the movement of trains over so vast a network of railroads.

A committee from the International Car Accountants' Association laid before the convention the report and action of that association on per diem car service at Atlanta last spring. This report was, without debate, referred to a committee consisting of Theodore Voorhees, New York Central; P. P. Wright, Lake Shore & Michigan Southern; S. M. Prevost, Pennsylvania; F. K. Huger, East Tennessee, Virginia & Georgia; C. H. Platt, New York & New England; G. B. Harris, Chicago, Burlington & Northern; H. F. Royce, Chicago, Rock Island & Pacific.

Commander Brown, Assistant Superintendent United States Naval Observatory at Washington, addressed the convention on the subject of the telegraphic distribution of accurate time. The subject matter of his address was referred to a committee consisting of E. B. Thomas, Richmond & Danville; Joseph H. Sands, Norfolk & Western; G. S. Gatchell, Western New York & Pennsylvania; Cecil Gabbett, Western of Alabama; E. C. Brown, Chicago, Burlington & Quincy; T. J. Higgins (Superintendent of Telegraph), Bee Line.

TECHNICAL.

The Car Shops.

The Laclede Car Co., of St. Louis, has completed and occupied an addition to its mill, covering 40 by 80 ft., and has also built a plant for fitting up car wheels. Among the tools composing the latter are a car wheel borer, axle lathe and hydraulic press.

The Connecticut River has ordered 20 box and 20 flat freight cars of the Wason Works, Brightwood, Mass.

Contracts have been awarded by the Department of Railways and Canals for the manufacture of about 500 new cars for use on the Intercolonial Railway. The Ontario Car Co.'s share of the work is 100 coal cars, the James Harris Car Co., of St. John, N. B., securing the balance.

Locomotive Building.

The Baldwin Locomotive Works report that the business of that establishment was never greater than now, and that they expect to exceed the last year's capacity in 1887 by 100 locomotives, which will be at the rate of fifteen a week. They are employing 2,700 hands.

Bridge Notes.

Proposals are invited for the erection of a 150 ft. span iron bridge. For further particulars address William P. Kelly, San Angelo, Tex.

The Mount Vernon Bridge Co. has the contract for the manufacture and erection of the aqueduct bridge over the Potomac, at Washington.

The Birmingham Bridge Co., of Birmingham, Ala., has reorganized as the Birmingham Bridge & Bolt Co., with a capital stock of $100,000. W. P. Kearney is President, and C. W. Wood Secretary and Treasurer. The company will triple the present capacity of its plant.

San Angelo, Tex., will build an iron bridge 150 ft. span, with approaches 240 on one side and 180 on the other. Piers to be 45 ft. above low water, that being considered safe from high water. Roadway to be 18 ft. wide. Address W. S. Kelley.

The Pratt Bridge Co., of Coffeyville, Kan., will establish a branch of its works at Denver, Col.

The Canton Bridge Co., Canton, O., has been awarded the contract to build the Marshall avenue bridge at St. Paul, Minn. Cost, $109,100.

C. D. Langhorne, of Richmond, Va., has been awarded the contract to build a bridge for the Columbia, Newberry & Laurens Railroad Co. Cost, $40,000.

Manufacturing and Business.

The Union Switch & Signal Co., of Swissvale, Pa., received the following orders for interlocking machines last week: One junction from the Central Railroad of New Jersey, one from the New York City & Northern, one from the Minnesota & Northwestern and one from the Michigan Central.

The Smith, Beggs & Rankin Machine Co. will build two engines, each 24 by 48 in., for cable roads in Kansas City. For the proposed light rail mill of the Belleville Nail & Steel Works they have an engine 30 by 60 in. in an advanced state of completion. The pulley which goes with this will be cast in two pieces, each weighing 30,000 lbs., and will run at the high speed of 145 revolutions per minute. Included in other work in hand is a huge cotton compress, the cylinder of which is 90 in. in diameter, with 5-ft. stroke.

Articles of incorporation have been filed incorporating the Tanner Car Wheel Co., of Buffalo, N. Y.; capital, $100,000. The incorporators are: Edward L. Brady, Charles E. Williams, Henry Tanner, Samuel W. Tanner and Louis J. Fox.

The M. C. Bullock Mfg. Co., Chicago, Ill., report the following among their late important shipments; To Bessemer Mining Co., Hurley, Wis., four 5 ft. standard band friction hoisting drums, Lane's patent, with an 18 × 32 in. engine; to Jackson Iron Co., Negaunee, Mich., one double portable band friction hoist; to E. B. Hamlin, Chicago, Ill., one gas engine; to David Boyle, for Fairbanks Canning Co., Chicago, Ill., one 75-ton ice machine; to the Iron Belt Mining Co., Hoyt, Wis., two 5 ft. Lane's standard drums, and one 18 × 25 in. engine; to the South Elgin Stone Quarry Co., Elgin, Ill., one quarry drill and outfit.

The Van Depoele Electric Railway & Power Co. has been incorporated with a capital of $2,000,000 to supersede the Van Depoele Electric Manufacturing Co. The new company will proceed to at once build a new $500,000 factory.

Snyder, Wilson & Co. have been given the contract for erecting the 5,000,000-gallon pumping engines for the McKeesport (Pa.) water-works.

Edward Kendall & Sons, of Cambridge, Mass., have just shipped 7 of their large hoisting engines to Philadelphia and will forward 6 to the Pacific Coast this week.

Iron and Steel.

The Atalla Iron & Steel Co. will begin work on its furnace Nov. 1, at Atalla, Ala.

The Hartman Steel Co. has ordered a 750 horse-power Porter-Hamilton engine from William Tod & Co., of Youngstown, O. for its new rod mill.

William Tod & Co., of Youngstown, O., are running double turn to supply the demand for their Porter-Hamilton engine. They have orders from Jos. Fisher, of Springfield, Mo., for a 310 horse-power; Hartford Pulp Co., Hartford Ind., two of 145 horse-power each; Hartman Steel Co., Beaver Falls, Pa., one 750 horse-power; Carnegie, Phipps & Co., Homestead, Pa., one 145 horse-power, and Chicago Arc Light and Power Co., two 500 horse-power Williams compound condensing engines.

The Rail Market.

Steel Rails.—Prices have declined, and sales for 1888 delivery have been made at $34. One of 8,000 tons to an Illinois road is reported. Quotations, $34@$35.

Old Rails.—It is reported that sales aggregating from 6,500 to 8,000 tons have been made to Western buyers. It is stated that $22.50 has been offered and refused for a lot of 2,000 tons of tees.

Scrap.—Yard scrap is quoted at $21@$23

Rail Fastenings.—Quotations: Spikes, 2.25@2.40c.; angle bars, 2.10@2.20c.; bolts and nuts, 3@3.25c.

The Sharon Steel Casting Co.

This company has started a steel casting business at Sharon, Pa., with T. H. Buhl as President, S. McClure Vice-President, Daniel Eagan Manager, and B. T. Watkins Superintendent. A building 120 by 150 ft. has been built, containing one 15-ton furnace, a 25-ton traveling crane, two producers, two large annealing furnaces, one battery boiler and one large core oven. These furnaces are all operated with manufactured gas.

A Railroad School in Budapesth.

A railroad school was opened in Budapesth Sept. 3, and instruction began at once with 200 pupils. Many distinguished visitors were present at the opening, including high officers of state and representatives of the Hungarian railroads.

The Gothard Route.

The council of the canton of Schwyz has begun the examination of projects for two short lines tributary to the Gothard Pass. It is said that these lines are of considerable importance as auxiliaries in picking up local traffic.

The Train Telegraph.

The Consolidated Railway Telegraph Co., on Thursday, Oct. 6, took some 200 electrical experts, telegraph and telephone officials, capitalists, railroad men and others on an excursion over the Lehigh Valley road to inspect the working of its induction system, accounts of which were given in the *Railroad Gazette* of July 22 and Sept. 16, pages 481 and 603. A special train of six cars left Jersey City at 13 o'clock and ran to Easton, Pa., and back. A lunch was served on the train, and the large party ate and drank, and took turns at watching and patronizing the operator at their leisure. A large number of messages were sent from the train and numerous answers received. Among the railroad men present were C. Hartshorn and J. D. Garnett, Vice-Presidents; H. Stanley Goodwin, General Superintendent; James Donnelly, Division Superintendent; E. B. Byington, General Passenger Agent, and G. Broadhead, Train Dispatcher, all of the Lehigh Valley; C. Selden, Superintendent of Telegraph Baltimore & Ohio; F. S. Gannon, Staten Island Railroad; C. Goddard, New York City & Northern, and M. B. Leonard, Newport News & Mississippi Valley.

Pullman Additions.

The Pullman Palace Car Co. has just put in use a new building, the dimensions of which are about 300 by 300 ft., with track capacity for completing 45 cars at the same time. The addition will admit of an increase of 500 in the force of workmen.

A Permanent Technical Exhibition at St. Petersburg.

A technical association has been formed at St. Petersburg, under the name of the "Association of Engineers of Ways and Communications," with the purpose of examining designs and materials, securing patents and providing plans and studies for various technical work. The association also has established a permanent exhibition at St. Petersburg, and will receive, exhibit and sell machinery, instruments, etc.

The agent for North and South America is Mr. A. Warschausky, 14 Dey street, New York.

RAILROAD GAZETTE

Published Every Friday,
At 73 Broadway, New York.

EDITORIAL ANNOUNCEMENTS.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

The absolute block system would prevent such collisions as that on the Chicago & Atlantic, and an Englishman would naturally point to this as the chief moral of the disaster. Americans deem this safeguard wholly out of the question on roads with light or medium traffic, but it is by no means certain that this view is justifiable. In fact, blocking is already employed for through traffic in a few cases. The Northern Pacific, we believe, applies it to passenger trains on steep mountain grades. The Canadian Pacific claims in its advertisements to be using it regularly to protect passenger trains. The principle is applied in train dispatching; why should it not be extended? Some of the regular blocks on double track roads are nearly or quite as long as the average distance between stations on many roads. To be sure, those who use the block system are tempted to make it permissive, and this temptation is yielded to both here and in England; but so long as this continues freight collisions will continue and Doncaster disasters will occasionally happen. This misuse of the system does not impair its value when rightly used, of course. Blocking is absolutely necessary as a means of humanity in cold climates. Who can have the heart to send a man with a flag when the temperature is 30 or 40 below zero? This has been the experience on roads in the blizzard country of the Northwest; a brakeman must disobey rules or freeze to death. If blocking is necessary in the North it is possible elsewhere.

The Time Convention has passed its final approval on the completed uniform code, and the Committee, the merit of whose labors needs not to be told to the readers of the *Railroad Gazette*, has been discharged. If superintendents will now, in adapting these well-digested principles to their individual cases, put forth a tithe of the intelligent work that has been done to bring the improvement up to the present point, they can hardly fail to take a good step forward in the general progress towards an ideal standard, each doing his part; and if they will then do as well as they know how in educating their men up to the point of obeying the rules, a marked improvement in the service can hardly fail of realization. Blind ourselves as we may by talk about human fallibility, the impossibility of getting above the average, and other drawbacks, it remains true that on all sides too much dependence has been placed on the issuing of "instructions," and far too little attention given to seeing that "instruction" in its full sense was really accomplished. Many railroad men would do well to turn to Webster's Unabridged and note the precise meaning of this word.

The convention accomplished little else, postponing the important car-service problem to the spring meeting, and adjourning at the close of the first day.

The meeting of the Superintendents' Association, of which an account will be found in another column, was not quite so well attended or as interesting as that of last April, many of the members being detained at home by press of duties, which the present general activity in business seems to have imposed upon nearly all railroad men. A comparatively young association like this needs the active support of all its best men, because, like other railroad associations, the men composing the membership are so much more used to action than to discussion. As in the Master Car-Builders', Master Mechanics' and other associations, there are numbers of men with heads full of good ideas who are not free to air them until after considerable preliminary ice-breaking has been done. This association seems somewhat inclined in its discussions to take up questions which might be considered the exclusive property of other associations, such as those concerning track, which the road-masters talk about, and concerning rolling stock, which the car-builders or master mechanics can handle. While the superintendents can, of course, discuss such matters as these with great intelligence, and do most certainly feel a lively interest in them, the query arises whether they ought not to leave such matters of detail to their subordinates, who are immediately concerned in the various departments, and turn *their* attention to a different class of questions—those which superintendents alone have to deal with, and which, in a sense, are larger questions than those connected with the technical subjects which occupy the attention of the older organizations. Superintendents' duties cover a wide field and are governed by a great variety of principles which are by no means easy of interpretation or explanation. This makes discussion difficult, and, in fact, impossible, without serious preparation and study. Nevertheless, a beginning should be made, and it would, undoubtedly, soon justify itself and produce pleasing results. The list of questions proposed by the Roadway Committee, while including many things which have been much discussed already, contains some which are especially interesting, particularly those in the latter part of the list.

The proper title for various officers is a question that has a good many sides to it; it came up incidentally at the Superintendents' meeting but was not discussed. Many of the terms now in use certainly have a strong savor of localism about them, and it would tend much to simplicity of language and so to clearness of ideas if some of the least valuable and least expressive could be abolished. A lack of concise expressions to designate the exact nature of some of the offices is the greatest need. What is a Master of Transportation? What is transportation, and wherein is the word applicable to one department of railroading more than to another? Is not the whole business transportation? What is the difference between traffic and transportation? Why should an officer who has charge of trains *and stations* be called a Trainmaster? Would not trainmaster and assistant trainmaster be often more precisely descriptive than to use *train dispatcher* for the last named officer? What is the difference between a superintendent of transportation and a master of the same? What is a yard master but an assistant station agent, or a station agent without the prefix, where his yard is separated from a regular station by a mile or several miles of main track? Why should a person holding two titles, as Vice-President and General Manager, waste his own ink and other peoples' by allowing both titles to be used together always? Who invented the unwieldy title "Assistant to the President?" Does a Comptroller experience any more agreeable sensations in his inner consciousness than does an auditor? Why don't someone invent a good short word for Superintendent? These are some of the questions in the nature of conundrums that occur to men's minds occasionally.

FORCED REDUCTIONS IN RAILROAD RATES.

The railroads of the upper Mississippi Valley have much to fear from the action of the state authorities in the immediate future. The trouble is not so acute as it was in the day of the Granger movement, but it is hardly less serious. So many people have forgotten the lessons of 1874 that they may insist on learning them over again by bitter experience.

The fundamental trouble is the same in the two cases—the fall in the price of wheat. When wheat is high, as in 1870 or 1881, there is money enough in the business to furnish a good profit for farmers and railroads both. When the price falls, there is no such profit to be divided; and each party tries to shift the burden upon the other. The railroad, acting through its freight agents, tries to keep the rates as high as the traffic will bear; that is, it makes only such reductions as will prevent shrinkage of shipments, and place the district which it serves on an equality with other districts. But the farmer wishes to go farther; and, acting through his representatives in the Legislature and elsewhere, he tries to bring the rates down as low as the traffic will bear—that is to say, down to the point where any further reduction will cause a diminution of railroad facilities and thus react against himself.

The farmer, like the railroad, has his fixed charges and his operating expenses; the former for interest and general maintenance, the latter for farm labor, seed, and current repairs. It is not unlikely that the proportion of these two elements in cost is somewhat the same in both cases. Suppose that a price of 95 cents a bushel for wheat in Chicago would cover operating expenses and fixed charges for farmers and railroads both, and that a price of 55 cents a bushel would barely cover operating expenses, without leaving anything for fixed charges. As long as wheat was as high as 95 cents a bushel, there would be little quarreling: the surplus would be so large that it could be divided amicably. If on the other hand wheat fell below 55 cents a bushel, there would be nothing left to quarrel over. Railroad and farmer both would save more by withdrawing from business altogether, than by trying to do it at a rate which did not pay operating expenses for either party. Nor can the price remain so low for any length of time, because the traffic will cease, the supply in the market will be at once sharply diminished, and prices will soon begin to recover.

But if the price of wheat stands between these two limits the result is not so simple. As long as there is any margin above operating expenses, even if it be a small one, the quantities sent to market will not be very much diminished. For the farmer to stop producing or for the railroad to stop carrying would involve a worse loss than to go on at the reduced rate. The surplus above operating expenses is insufficient to satisfy the demands of all parties; but it is better than nothing. It is not enough to divide amicably, but it is quite enough to quarrel over. This is precisely the state of things to-day in many parts of the upper Mississippi Valley.

In some respects the situation is not nearly so bad as in 1873. The two parties to the question understand one another's necessities somewhat better now than they did then. At that time the railroad managers had had no experience of legislative control. They did not see their danger, and did not understand the necessity of conciliating local public opinion. They not only refused to make concessions, but they too often aggravated their refusal by discourtesy. Therefore when the farmers had gained control of the legislative machinery they used it relentlessly and even recklessly. The railroads received quite as little consideration as they had given. There was a sweeping reduction in rates to the level of bare operating expenses. When the Potter law of Wisconsin had been in force two years, no railroad in the state was paying dividends, few were paying interest, and many found their income insufficient to meet the ordinary expenses of maintenance. We shall probably never again be called upon to face a crisis quite so severe as this was.

But there are, unfortunately, other respects in which the dangers to-day are even more serious than they were fourteen years ago. In the first place, the suddenness and severity of the legislation of 1873 and 1874 furnished a guarantee that it could not long be kept in operation. Wherever its provisions were fully carried out it at once produced a reaction. Capital was frightened away from those states which adopted so destructive a policy. The farmers lost far more by preventing the development of the country than they gained by the reduction in rates. The very weakness of the railroads proved a source of strength. They could not live in the face of adverse legislation; therefore the farmers could not pass such legislation without destroying their facilities for getting their produce to market. And to-day, on the other hand, the strength of these railroad systems tends to put them, in some respects, more at the mercy of legislative action. They have such masses of capital invested that they are not likely to be crippled in business. You may trench upon their dividends without being restrained by the fear that they will withdraw their facilities. The action of one or two states may weaken them, but it will not kill them. In Mr. Jeffery's able argument before the Illinois Railroad Commissioners on the subject of the proposed reduction in rates, he showed how little margin of profit was allowed under existing conditions. He showed how in some of the most fertile parts of Illinois branches of his system were operated at a loss; and how few of the Illinois railroads were in a really prosperous condition. His use of figures was guarded, and his deductions were sound. But will his argument have the desired effect upon public opinion We fear not. As long as the other portions of the Il-

linois Central system enable it to earn 7 per cent. on its capital stock, people will think that there is no very great hardship in subjecting it to restrictions which, taken by themselves, would be unfair. What is true of the Illinois Central is true of the other great systems which radiate from Chicago. And when, by the legislation of other states, or by the changed conditions of traffic, the business which now is profitable loses its special advantages, there will be nothing to compensate for the burdens which the authorities of Illinois have proposed to lay upon the railroads within their jurisdiction.

But this is not the only serious feature in the present case. These enforced reductions come at a time when there is very little hope of meeting them by improved railroad operation. We do not mean that there is no chance for improvement in this direction, but that we seem to have come to the end of the general movement by which such sweeping reductions in charge were made possible and advantageous a few years ago. Steel rails have been laid so universally that there is no more chance for saving in this respect. The weight of car-loads has been increased to near its limit. It seems not unlikely that we are reaching the limit of economy in heavy train loads. These limits of car-load and train-load weight will be reached all the sooner on account of the workings of the short-haul clause of the Inter-state Commerce law, for anything which tends to favor local as compared with through traffic diminishes the relative advantage to be derived from heavy cars and heavy trains. The reductions of cost in the immediate future seem likely to be made by improved organization rather than improved operation, and there is, we fear, no reason to expect more than a moderate saving from this source.

Even this moderate saving will be hindered if the state authorities prescribe sweeping reductions in rates. This is one of the difficulties of state interference with industry. If a man finds himself forced by business necessities to reduce his charges, he will attempt to hold his own by better economy. But if such a reduction is prescribed by state authority, economy affords no protection. The state is restrained only by the necessity of leaving the railroad companies enough surplus to prevent them from withdrawing their facilities. Better railroad economy does not mean that the companies will be left a large surplus, but that the authorities will have a still further margin for reduction of rates. The railroad is in the position of a slave, who, knowing that his master must give him enough to keep him alive, and knowing, also, that he never will give him any more, has no incentive to use his powers either with vigor or with economy. How wasteful such labor is we all know perfectly well.

We do not say that matters will go as far as this; but any man who has watched the recent course of legislation must see that there is danger to be apprehended in this quarter. For three years past, many of the states of the Mississippi Valley have been tightening the reins of authority. Last winter the passage or the Inter-state Commerce bill gave the signal for the introduction of a number of state laws modeled upon it, but far more severe in their provisions. It is impossible, as yet, to say how much harm will be done by these measures, but the state of things is such as to give ground for serious anxiety.

The Coupler Vote.

The "coupler ballot" of the Master Car-Builders' Association closed Monday, and the recommendation of the Executive Committee is adopted. This required two-thirds of all the votes cast, and its passage indicates that a substantial majority of the members of the Association wish to put in use a vertical plane automatic coupler of a common type, and are willing to accept the Janney type as the standard. At this writing the votes have not been officially canvassed by the Executive Committee, but the result will be not far from 475 ayes to 190 noes, or as much as 30 votes more than the required two-thirds. The total vote, about 665, is probably more than three-fourths of the entire possible vote, which was a year ago 720, but has been during this summer materially increased. It should be noted, however, that the 665 votes cast in this ballot were given by only 108 persons, showing that more than one-half of the members were either indifferent or unwilling to commit themselves. It is not safe, therefore, to count on two-thirds of the Association as being actively in favor of the Janney type; but it is undoubtedly safe to assume that it has a substantial majority, and that much is very satisfactory, for this is a case in which the value of legislation depends, more than commonly, upon the public opinion back of it. Even now no member of the Association is obliged to use the standard coupler unless he wants to. There is no machinery to enforce the will of the Association, and its standards can be adopted only as they are such as the members individually are willing to accept. While, therefore, it is unfortunate that the sentiment was not such as to call out a full vote, it is encouraging that of those who did vote, two-thirds favor the type chosen by the Executive Committee. Of those voting against it or not voting at all a considerable number will of course be ready to accept the decision of the majority and adopt a hook coupler that will couple with the Janney.

This action of the Master Car-Builders' Association is one of the most important steps that it has ever taken, and that is saying a good deal, for the world owes it several debts for good things done in the past. It has now brought us in sight of the great reform in car coupling. Delays and complications there will yet be; the reform will still have to advance slowly, but it has now been put on a definite track, and time and energy heretofore wasted will be concentrated toward a definite purpose. This is the great advantage of having fixed a standard. Some individual effort will be discouraged and cease, but what remains will be more intelligently directed. Whether or not the standard is an ideal one or even the best now attainable, does not so much matter. The main thing is to concentrate force and save waste. That the adoption of a standard accomplishes, and there is still ample room left for the competition of designers and makers to insure the rapid and steady perfection of the coupler in type and in detail.

Of the ultimate good of this action there is hardly any question. The saving of life and limb which will result from the use of an automatic coupler is and should be the first consideration. To the importance of this the companies are pretty well aroused. The economies in operation from the use of a close coupler without a link are not so well understood, or so generally admitted. The item of saving in lost and broken links and pins alone will be enormous. We remember the statement that the average loss on the New York Central for 10 years, from links and pins lost, broken and stolen was some $50,000 a year. This at $25 per car would equip 2,000 cars with hook couplers. But it would not be surprising to find that the saving in cost of hauling is the greatest of the economies of close coupling. It will be remembered that the Brake Committee of the Association found that an engine could start more cars than it could pull,—that the greatest duty of the engine was after all the slack was out, and that there was little difference in the ability of an engine to start a train with loose or tight links. Up grade, however, the difference in starting was in favor of the tight coupling. At a recent meeting of the American Institute of Electrical Engineers, Mr. Schlesinger related his experience with an electric motor at the Lykens Valley coal mines. The trains there are sometimes of 100 tons, and have to be started on curves of 25 ft. radius. He finds that the starting "would be very easy if it were not for the fact that the cars are generally bumped together, and the load is not all put on the motor at once, but gradually. One car starts after the other, and this is an objectionable feature so far as easy starting is concerned." In starting, as seems pretty well demonstrated, loose coupling is no better, if as good as tight, or elastic coupling. But in hauling a train under way, up and down grade, it will undoubtedly be found that the power is less and the wear and tear very much less with tight coupling.

On the other hand, the necessary relation supposed to exist between tight coupling and continuous brakes promises to become less important. It was some time ago demonstrated that by the use of electricity the brakes could be applied on a loose coupled train without shock, and the last Westinghouse experiments demonstrate as much for brakes operated without electricity. This presupposes, however, the use of the best brake apparatus in perfect order, and it will no doubt be found in practice that tight coupling is necessary to the best performance of continuous brakes.

Reform in Car Service.

In another column will be found a letter on this topic from a trunk line officer, who, it will be remembered, gave some clear and forcible views in the same line to the readers of the *Railroad Gazette* last May. It is unfortunately true that the preoccupation of general managers and superintendents keeps back this reform. These men, like everybody else, have to attend to their most serious concerns first, and so in the present general activity a matter like this—which, however, does not bear postponement because it is of secondary consequence, but because other things *must* be done and this *can* wait—is continually kept "on the table." Mr. Fink tried before he went to Europe to get a meeting of managers, but they were all too busy. This multiplicity of duties, which frequently causes a "rush" in the current of things which a superintendent must attend to, is a constant perplexing factor in the lives of many of them, and should lead to serious consideration of the question whether the office of car-service manager should not be raised to a more important plane, and be provided for in such a way that its important affairs could receive their due share of attention without regard to what other things might be pressing.

The Pennsylvania will be doing a service to the roads of the country in making this trial of the new plan, even if no more roads join, for it has a large family circle of its own, the lines west of Pittsburgh being included in the action taken. So far as the purposes of an object lesson are concerned, observers can learn just as well as though the Pittsburgh, Cincinnati & St. Louis and the Philadelphia, Wilmington & Baltimore, for example, were under entirely separate management and ownership. While the various parts of the Pennsylvania system are under one head, and this move is thus rendered possible, the differing conditions of ownership and control of the different portions are at the same time such that the experiment will be a real one and not a mere make-believe like banking in a commercial college.

The settlement of a plan of accounting for switched cars will probably cause considerable discussion, because work of this kind is done under such diverse conditions, some roads being practically compelled to continue methods which are admitted to be unscientific. It is not so very long ago that switching was done with little or no system or regulation, often taking the form of a favor which was granted gratis, and there are many undesirable features in the business hard to root out. All the shorter and smaller roads will probably have more or less of good reasons for reluctance in joining the Pennsylvania and Erie, and the owners of city roads, belt lines and others that do little or no business but switching will feel themselves to be aggravated cases of "short line."

The Time Convention seems not to have been in a mood to take up the careful and perhaps slow work of discussing the car service problem, and the car accountants' report was consequently put over to the next meeting. This delay is doubtless annoying to those who have fully investigated the subject, and are ready to take decisive action; but a committee, with time to act deliberately, will most likely arrive at sounder conclusions than would be reached by the convention as a whole.

The Kouts Accident.

This disaster comes at the opening of the car-heating season and will occasion renewed and serious anxiety among thousands of railroad officers who are diligently striving to do their duty in the providing of safe conditions for their passengers. Those who have made progress in equipping their cars with steam apparatus will be quickened to redoubled exertions, and those who are still undecided must be more than ever impressed with the gravity of the situation.

No one should allow anything but the utmost vigilance to satisfy his conscience in this matter. Questions of comparative cost of different systems, of greater or less prospect of uniformity, of more or less difficult mechanical obstacles should not be postponed because they are knotty and demand an unusual expenditure of thought and time; they demand *settlement* on some basis, even if far distant from the ideal.

But the lesson of the fire, solemn as it is, must be regarded as secondary, nevertheless. The theory held by many good railroad men that the first duty is to keep cars whole and on the track rather than to provide for safety after they are broken or derailed has in it a large element of logic; and we are here again reminded of the endless variety that characterizs the elements of danger on a railroad; and this sacrifice re-enforces previous lessons, which to the intelligent human view seemed impressive enough already. The most intelligent and praiseworthy efforts may be put forth in a dozen, different directions, and yet a single unprotected point brings down the most distressing consequences.

The accounts state, apparently on the authority of the Superintendent of the road, that the place where the passenger train stopped was provided with a semaphore distant signal and that a brakeman pulled the lever to set it at danger. If this is so the lesson of the disaster is greatly simplified. Rear collisions are, alas common enough, and various causes contribute to them;

but simple carelessness and neglect of the plainest of duties seem to afford the one and sufficient explanation here. If a freight followed a passenger train within three or four minutes, in a locality where fogs are common and sudden, and was not kept under control, there was gross carelessness on the part of both the conductor and engineman; and with a reasonably high standard of requirements the brakemen and fireman would be held bound to at least protest against such recklessness. An engineman has no right to assume that a preceding passenger train is running at full speed until he is at least five minutes behind it; and, as we have heretofore remarked, it is a question whether this interval ought not to be made longer. If the simple rule that the fireman, as well as the engineer, must look for fixed signals is not enjoined and enforced, the management of the road has a serious question to ask itself; and if the location of the semaphore allowed too short a distance to stop in, or trains have habitually passed such signals at too high a speed for stopping according to the signal's indications, another question of equal importance presents itself to the officers. If the rear brakeman should have gone back the same as though no fixed signal existed, the Superintendent should be able to say whether this kind of negligence has been noticed before. The very fact that brakemen shirk this duty—and the more persistently when they feel a dependence upon the aid of fixed signals—is in itself a sufficient reason for extraordinary exertions in reining them up to obedience. Does the fact that this evil is a very difficult one to cope with afford any excuse for the inane policy which tests no man's intelligence or fidelity until after he has made a blunder and it has been discovered?

The moral, therefore, is found in the simple, perhaps homely, line that has been preached in these columns often before, and the sermon ought not to need repeating. It is not our business to estimate the *extent* of the loss in money and reputation which road and officers may suffer; indisputably it is extensive enough. The fact that "others are in the same boat" should be allowed to give no feeling of security whatever.

Counterbalancing Locomotives.

The communication on the subject from Mr. Walter Vielbaber, published elsewhere, is a very useful and practical method of proportioning a counterbalance for an assumed load, and will give accurate results when the weight to be counterbalanced is correctly chosen. Mr. Vielhaber assumes that the proper method is to use the actual weight of the revolving parts (parallel rods, connecting rod and connecting pins) and two-thirds of the weight of the reciprocating parts (piston and rod, cross-head and main connecting-rod), if, as we understand him, he means that the weight of the reciprocating parts on one side is to be used in applying his formulæ. This might give good results at one speed of locomotive and be very defective for other speeds. The force required to start and stop the reciprocating parts at the extremities of the stroke, without shock, must be furnished by a counterbalance or some similar device, and this force varies as the square of the speed of the locomotive, its numerical value being, in the case of a connecting-rod without angular vibration (or of infinite length):

$$\frac{341}{1000000} \times \text{weight of reciprocating parts} \times (\text{revolutions per minute})^2;$$

and the moment of the reciprocating parts to be balanced is the above force multiplied by the length of crank. Hence it will be evident that the neglect to consider speed in proportioning the counterbalance might be serious. Moreover, in practice, the connecting rods of locomotives being of finite length, have sensible vibration, and thus modify the preceding figures. The table which follows illustrates this point more fully:

Item.	Ratio of length of connecting rod to length of stroke.			
	2		2¼	
	Forward stroke.	Return stroke.	Forward stroke.	Return stroke.
Factor for initial accelerating or retarding force; to be multiplied by weight of reciprocating parts and square of number of revolutions per minute.	.000426	.000255	.000416	.000265
Point of stroke at which acceleration ceases and retardation commences	.438	.562	.455	.555

Item.	Ratio of length of connecting rod to length of stroke.				
	2½		2¾		∞
	Forward stroke.	Return stroke.	Forward stroke.	Return stroke.	Forward and return strokes.
Factor for initial accelerating or retarding force; to be multiplied by weight of reciprocating parts and square of number of revolutions per minute	.000409	.000272	.000402	.000278	000341
Point of stroke at which acceleration ceases and retardation commences	.450	.550	.455	.545	500

From the foregoing it appears that, with connecting rods of finite length, the forces to be balanced at the two extremities of the stroke vary so much as to render accurate balancing impossible. And since the accelerating and retarding forces are reduced to zero at the points where acceleration ceases and retardation commences, disturbances would be introduced at those points, on account of excessive counterbalance, even if it were possible to furnish a perfect balance at the extremities of the stroke. In practice the best results seem to be attained by using an average counterbalance (calculated with the mean of the two values for initial accelerating and retarding force of reciprocating parts) for the highest speed at which the locomotive is to be operated.

Another point is deserving of consideration in attaching the counterbalancing weights to the driving wheels. It is not sufficient for the weight to be placed so that its centre of gravity is opposite the centre of gravity of the crank-pin on each wheel, but these two centres of gravity should also be in the same vertical plane, so as to avoid the twisting effect which would otherwise be produced.

The American Society of Civil Engineers.

It has long been felt that this, the oldest and strongest of our engineering societies, was not attractive to young engineers, and it is an open secret that many of the members have discouraged applications for membership in the junior grades, even though the Board of Direction, in conformity to a resolution of the Society, issued a circular in 1885, inviting the presence and co-operation of younger men. At the convention of the Society, held at Hotel Kaaterskill last July, a committee, whose report is referred to on another page, was appointed to report on the advisability of adding a new grade of membership called "Students," and on the changes in the laws of the Society necessary to provide for the addition.

As implied by the membership of the American and other societies, the obligations of engineers to their profession is generally recognized. The proposed additional grade implies a recognition of their obligations to the young men who must in the natural course of things, sooner or later, take the professional positions now occupied by their seniors. Assuming that each member of the Society will vote on the proposition in conformity with his views as to the sum of advantages and disadvantages inherent in the proposed change, it is suggested that a yearly assessment of $10 and $6 is liable to be a serious tax on young men who are struggling to acquire an education and fit themselves for positions in life, and through this consideration many of them will fail to derive the advantage that would accrue from acquaintance with the masters of their future profession and from access to the publications of the society during the time they are acquiring their theoretical education.

Mr. Brooks' suggestion that the students or juniors be notified of the applications for admission to that class seems a good one, and the attention of the members of the Society is called to his views on the punch-bowl. It is very convenient if not necessary to have a collation of some sort after the meetings, and the informal gatherings about the lunch-table are possibly as valuable professionally as the more formal meetings preceding the lunch; but as Mr. Brooks says, strong prejudices against the punch are entertained by many members, while those who like that addition point to the entire absence of any excess since its first introduction. That it is distrusted, however, is shown by the arguments referred to in the quoted remarks.

That clause in the proposed amendments making associate members and associates ineligible to office, as far as the office of secretary is concerned, might possibly be revised with convenience to the Society. The present very efficient secretary of the Institute of Civil Engineers is not a full member of the Institute, and it is not understood that he is an engineer. The multitudinous and exacting duties of this office, which is now so admirably filled in the American Society, call for qualities and conditions very hard to combine; and it is desirable that the field for choice should be as wide as possible.

A dispatch from Moorhead, Minn., Sept. 29, says United States Commissioner Tillotson has held Mr. McFeely, station agent of the St. Paul, Minneapolis & Manitoba road, under $1,000 bonds to appear before the District Court at St. Paul, Oct. 3, and answer to the charge of violating Sections 3 and 4 of the Inter-state Commerce law. Mr. McFeely had refused to transfer wheat from the Manitoba to the Northern Pacific tracks, and complaint was made against him by a farmer named Benedict.

A contemporary, mentioning this application, states that it is the first one in which the application has been made direct to the Court, instead of to the Commission in the first instance. But the Inter-state law does not deprive the Court of any jurisdiction which it formerly had or repeal laws which would otherwise operate. It gives a plaintiff an option to sue in court or complain to the Commission. Whether the Circuit or District has jurisdiction of a particular case has become somewhat less important, because Congress, at its last session, passed an act declaring that the circuit courts should have jurisdiction, concurrent with the state courts, of civil suits, where the value exceeds $2,000, in which there shall be a controversy between citizens of different states. Therefore, if Benedict and McFeely resided in different states and the sum demanded was sufficient, the suit against McFeely individually might be brought in the circuit court, irrespective of any limitation found under Section 9. The two acts mentioned do not refer to each other, though the effect of one on the other, enabling railroad customers to sue in the Circuit Courts directly for violations of the Inter-state law, may become important in some controversies waged by persons residing in different states from the persons whom they sue.

The following from Fargo, Dakota, is also in print:

The arrest of Division Superintendent Graham, of the Northern Pacific Railroad, to-day, is the culmination of a bitter fight between Mr. Hawks, of Buffalo, Dakota, and the Northern Pacific road. Mr. Hawks was refused cars for his wheat, he claims, and he then put the grain into sacks and delivered them at the station as common freight. He filled the platform and piled bags up in the waiting room until the station agent could hardly find room to breathe. Then the railroad company offered him cars, but he wanted to empty the sacks and ship the wheat in bulk. The company refused to allow this, and afterward, Mr. Hawks says, refused to give him cars to ship the sacks. He then caused the arrest of Division Superintendent Graham under the Inter-state Commerce law, which prohibits unjust discrimination. The grain law of Dakota makes it the duty of the railroads to furnish cars to farmers on side track, and Mr. Hawks first made his demand for cars under this provision of that law.

Until there is judicial decision to the contrary it must doubtless be held that whoever acquires under the Inter-state Commerce law a legal or equitable right of action against a defendant residing in another state than his own, for sufficient value may, as the general rule, enforce it in a circuit or district court; by aid, if the action is legal, of whatever remedies by arrest, attachment, etc., the law of the state allows. Or he may make complaint in his own behalf to the Inter-state Commission. He cannot do both, or try one, and failing in that resort to the other. This is clearly the purport of section nine.

In the current *Harpers*, the Easy Chair discusses the relation of character to the shutting of the open car-window. "The controversy," it says, "cannot be quickly settled by any means but courtesy. If to a polite request to close the window because of the discomfort be even peril to health which if opened it will produce, there or no reply but that you can do what you please with your own window, or that that the deponent has no intention of submitting to asphyxia, or if you don't like your seat you can take another, or briefly and compendiously that deponent hopes he knows his own business—if there be no reply but some form of this retort, there are but four courses to pursue" with "the Hottentot in front of you." Of these the Easy Chair seems to form a tranquil application of the newspaper method, namely, hold a newspaper just at the back of the offender against the side of the open window so that the blast will "carrom against it, and pour dust, ashes, cinders, smoke and pneumonia over the culprit himself."

But the gentle chair pleads for patience and courtesy, nor are such pleadings in vain in this country. How seldom does one meet on any train either the "Hottentot" or "the Hog" so often referred to, in the discussion of this popular question. The writer was once the victim, by pneumonia of such an open car window; but because he made no request for its closure, which, by the way, shows the importance of adding courage to courtesy. The weary or ill man who fears a draft for well defined reasons should not hesitate to request what the merely nervous or automatic person is always ready to ask. Hence the possessor of the open window has the right to know why he should close it. Does the request arise from fear of consequence, or merely from a personal objection to open windows? Here again is opportunity for courageous courtesy.

Meanwhile, the one cure for the evil itself is a better system of ventilation, and well-instructed brakemen in care of it.

The radical action taken by the New York, New Haven & Hartford, in planning the abolition of a large part of its grade crossings within a comparatively short length of time,

has apparently stirred up a great deal of feeling in Connecticut, where the question of the apportionment of the expenses for such changes as this has been prominent in political circles for some time. It will be remembered that we printed, some weeks ago, some opinions gathered by a town officer, from all parts of that state, on this subject. It appears that in many places the town officers, and doubtless many other citizens beside, are much exercised over the prospect of the various towns being called upon to pay out large sums, which, of course, the average voter regards largely in the light of extortion inflicted by a monopoly. In Connecticut, the hearings on these questions are held before the State Railroad Commissioners, and that body makes the decisions. A report this week states that a conference of the Governor and prominent men from different parts of the state has been held at South Norwalk, and that an urgent appeal was made to the Governor to call an extra session of the legislature to consider the repeal of the present law governing apportionments. It is said that the Governor agreed to request the Railroad Commissioners to take no decisive action pending his consideration of the matter.

It seems pretty certain that the famous Chinese concession has been annulled. The latest dispatches state that the Chinese government has definitely withdrawn. The defeat of the scheme is attributed to the pressure brought to bear upon the Imperial government by the British and German governments. This is not surprising when one considers the enormous importance to China of maintaining good relations with the British Empire. The great Asiatic powers are Great Britain, Russia and China, and China can ill afford to sacrifice the aid of England in the incessant struggle going on for political and commercial control. The trade relations too of China with British countries are very extensive and intimate, and it is not supposable that she will make concessions that are strongly opposed by the British government.

The various irregularities in both passenger and freight rates, which have been so common in the latitude of Chicago for the past month or two, seem to have infected the atmosphere there; and this, together with the near approach of the time when the Chicago, Milwaukee & St. Paul and the Atchison, Topeka & Sante Fe will have new lines to compete for the business between Chicago and Kansas City, has had the effect of still further weakening the Associations. A dispatch last Monday stated that the Chicago & Alton and Illinois Central had given notice of withdrawal from the Western States Passenger Association. There seems to be a great deal of crimination and recrimination between the Alton and the Wabash, each claiming that the other is responsible for the irregularities in rates.

The projected railroad from Los Angeles to Salt Lake City has been incorporated, directors have been appointed, subsidies are voted, right of way is granted and subscriptions to the stock are being taken in California, Nevada and Utah. It is said that the subscriptions of Salt Lake City are sufficient to build the road to the Nevada line and that Nevada gives the right of way and $3,000 a mile. The estimated cost of construction and equipment is now $15,000,000. The air line distance between the cities is about 550 miles and it is safe to assume that the estimate of cost at $27,000 a mile is low enough. The Los Angeles papers say that some heavy capitalists and skillful promoters from the East are interested in the enterprise.

The events of the week in the Baltimore & Ohio are the sale of the telegraph to the Western Union and the resignation of President Garrett. The latter event took place Oct. 12. Officers of the company deny that negotiations are in progress for the sale of the sleeping car property and business. The price paid for the Baltimore & Ohio telegraph is 50,000 shares of new Western Union stock and $60,000 yearly rental. At the directors' meeting on the 12th it was decided not to declare the semi-annual dividend which would be payable Nov. 1, and a considerable decline in the stock naturally followed. The passing of the dividend will make a serious reduction in the income of the Johns Hopkins University as well as in that of the city of Baltimore.

We would call attention to the address of Mr. Charles Latimer at the opening of the Roadmasters' Convention in Cleveland, which is printed on another page. Mr. Latimer's high ideas of man's duty to his fellow are inspiring, and we recommend them especially to our younger readers. To the elders his injunctions to cultivate softness of heart may come rather late in the day, but even they may be better men, for a little while at least, if they will read and reflect upon what he says of the relations of chiefs and their subordinates.

It is said that the Advisory Committee of the Pennsylvania Railroad Voluntary Relief Fund has decided to recommend that an employé reaching the age of 65, after 20 years of continuous service, may, at the discretion of the superintendent of his Division and on certificate of disability, withdraw from active service and receive as pension the wages which he is getting at the time of his retirement. This is an unusually liberal arrangement, but even were the pension less the principle is most commendable.

"Foliage Excursions" are the fashionable thing just now, the Erie advertising under this title to take people from New York to see the gorgeous colorings at Shohola Glen and along the road east of that point at very low rates. This, of course, is leaving a large part of the Erie's splendid scenery unexplored; but enough is as good as a feast; or, rather, a feast is better than a surfeit. A trip from New York to Susquehanna over the Erie fairly cloys one with the beauties of nature.

A Boston dispatch of the 11th states that the Boston & Maine has taken possession of the Boston & Lowell under the lease made early in the summer. There will, it is said, be no immediate change in the officers of the "Lowell system of the Boston & Maine" or in the service. The control of the Northern of New Hampshire, and of the Boston, Concord & Montreal still hangs on the outcome of the struggle in the New Hampshire Legislature.

The efforts to make a loan for the Red River Valley road of Manitoba has so far failed, and the province has issued bonds to the amount of $300,000. These are of $50, $100 and $500 par value, payable Oct. 1, 1888, and bear six per cent. interest. The Imperial Bank of Canada has undertaken to place them.

NEW PUBLICATIONS.

The *Michigan Central's* latest issue concerning the wonders of Niagara and the beauties of the scenery there and in other parts of the world reached by that road is a thick hand-book, with a gorgeous cover, entitled *Niagara and Beyond*. The book contains descriptive articles by distinguished writers, and takes a somewhat new departure in printing two of the articles in French and two in German. The work is embellished with the usual profusion of excellent wood cuts, and has also some finely executed phototypes.

The *Engineering and Building Record* is now the title of the paper hitherto known as the *Sanitary Engineer*, the old name being retained as a sub-title. On making this change it says editorially:

"We have decided to change the name of this journal to the title given in this issue. It is not intended to change the character of the paper. Our object is simply to convey by the first part of the name adopted the scope of the matter it regularly gives its readers."

In noting this change in name we offer Mr. Meyer our congratulations on the success of his admirable journal, and assure him of our good wishes for its future. The *Sanitary Engineer* has always been edited with a high ideal. No effort has been spared to make it the organ of the best opinion in the specialties which it has treated, and it stands as a fine example of clean and able journalism.

Record of New Railroad Construction.

Information of the laying of track on new railroad lines in 1887, not before reported, is given as follows:

Chicago, St. Paul & Kansas City, southwest from Des Moines, Ia., 57 miles, 45 miles since last reported.

Fort Worth & Rio Grande, since Jan. 1, 40 miles, hitherto unreported, 14 miles.

Kansas City & Pacific, from Parsons to Moran, Kan., 43 miles.

Ohio, Kentucky & Virginia, from Richardson to Preston, Va., 2 miles.

St. Paul, Minneapolis & Manitoba, west of Minot, Dak., 519 miles, 174 miles since last reported.

This is a total of 278 miles heretofore unreported, making 6,179 miles reported thus far for the current year. The new track reported to the corresponding date for 16 years has been:

	Miles.		Miles.		Miles.		Miles
1887	6,179	1883	4,835	1879	2,619	1875	930
1886	4,261	1882	8,190	1878	1,527	1874	1,242
1885	1,825	1881	5,459	1877	1,629	1873	2,955
1884	2,880	1880	4,275	1876	1,770	1872	5,312

This statement covers *main track only*, second or other additional tracks and sidings not being counted.

THE SCRAP HEAP.

The Accident at Kouts Station.

Another terrible train accident has followed the Chatsworth horror, a rear collision occurring on the Chicago & Atlantic, three miles west of Kouts Station, Indiana, about midnight, Monday, Oct. 10, in which nine or more were killed and 12 or more were injured. The engine of an east-bound passenger train broke an eccentric strap and was obliged to run with one side, losing some time. The train stopped at a tank, and, according to the reports, the engine man found it necessary to move the engine a short distance with a pinch-bar to get the tender opposite the spout, this consuming some time. Within a short time—some of the reports say one minute, others three—after the train arrived at the tank it was run into from the rear by a freight train which had been passed at a station only a few miles back. The sleeping car was at the rear and was pushed forward by the freight engine so forcibly as to crush the car ahead of it. The wreck took fire in a very few minutes, it is said from the heater in the sleeping car, and several of the passengers were burned, the survivors being driven by the heat from giving assistance. It appears that the road is straight for a long distance, and the engineman of the passenger train says that he saw by the headlight that the freight followed him closely from the passing place. It is also said that the night was very foggy (which conflicts with the engineman's statement about seeing the freight), that there was a distant semaphore signal for the protection of the watering station, and that a brakeman of the passenger train pulled the lever to place the signal at danger as soon as his train stopped.

Openings for British Trade in Mexico.

According to a report by Mr. Lionel Carden, Her Majesty's Minister at Mexico, a great field exists for agricultural and mining enterprise in that country, a fact which is now beginning to be realised by our competitors. The machinery trade may be considered as yet in its infancy, thus offering special inducements to business men, since most of the articles are admitted duty free. Of late years English hardware has been almost entirely superseded by similar goods of German and American make; but it is probable that the establishment of warehouses for the sale of these articles would be successful. English capital might also be profitably employed in buying ore for shipment to England. Two American agencies are already established in the capital for that purpose, but the cheaper rates of freight to England, and the lower cost of working, would enable English firms to compete with every chance of success. At present many mines are unworked in consequence of the heavy cost of the establishment of smelting works, and large quantities of ore might be obtained at moderate prices if some such stimulus were given to the export trade. In conclusion, Mr. Carden states that if English manufacturers are satisfied to leave the distribution of their goods in Mexico to foreign merchants, a considerable portion of the trade will undoubtedly be wrested from them by their more active competitors.—*Industries.*

These "more active competitors" will undoubtedly see to it that any present trade advantages which they have are not allowed to slip away from them.

The Crops of Manitoba.

A Winnipeg dispatch says that the crops in Manitoba this year, according to statistical reports, exceed all estimates. The Canadian Pacific will be utterly inadequate to move the crop. In many sections the yield has been 35 bushels to the acre. The average will be about 30 bushels. At this figure on an acreage of 432,134 acres the yield will be 12 099,864 bushels, leaving 10,000,000 bushels available for export. The barley crop averages 35 bushels on an acreage of 56,110 acres, or about 2,000,000 bushels. The oat crop will reach 5,000,000 bushels. Twelve thousand acres of flax have been harvested, giving a net yield of 180,000 bushels. The potato crop is 2,850,000, giving 1,000,000 bushels for export.

The Face at the Pane.

The conductors and brakemen have come to regard it as a duty on the part of their families to be at the window when their trains pass. A certain conductor on the Delaware, Lackawanna & Western, whose home is near Orange, is very particular to have this custom observed, and only discovered yesterday that his wife, for an indefinite period, has been circumventing him by having a dummy dressed in her clothes near the window, with a fluttering handkerchief, that gave her husband the idea she was there waiting to salute him.—*Newark News.*

The Nine Twins.

The latest trick adopted by the dear public, which loves liberty, for the purpose of extorting justice from its oppressor, the railroad, is the astute device of the theatrical managers, who bunch their blondes and brunettes, heroes and villains in a compact crowd and blandly present for their passage a "family ticket," which, of course, has been purchased at a reduced rate. If these people could have the aid of the accessories which they use in deceiving their auditors before the footlights, they could make a show of consanguineous affinity which would not fail to bulldoze the most cautious conductor. It is said that since the enforcement of the chilling rules engendered by the Inter-state law many managers have limited their people to one trunk each.

Grade Crossings.

Selectman Wheeler, of Norwalk, Conn., has been questioning his brethren in that state concerning the apportionment of the expense of abolishing grade crossings of highways and railroads, and has received 136 responses, which are classified as follows. Each reply gives the views of the majority of a single board, apparently.

Fifty say that the railroad should bear all the expense, where the crossing has been caused by the railroad. Twenty-two would have the railroad pay all the cost, even where the crossing has been caused by the town; 12 would have the companies pay one-half or more, four think the companies should pay a part, less than one-half, and nine think the companies should pay none of it. Thirty think the state should pay the part not borne by the railroad and nine think it should fall on the town.

This may doubtless be taken as a fair sample of average public opinion, but the one-sidedness shown would indicate that not many heavy railroad magnates sit in Connecticut municipal boards.

Doubtless They also Pulled.

An exchange says that the locomotive which plunged into the river at the Erie dock at 22d street, New York City, was raised simply by attaching a derrick chain to an iron bar placed inside the furnace door.

One Step Forward.

The Delaware, Lackawanna & Western has put in practice one reform for which travelers will bless it. Brakemen must now enter the car, shut the door, move down the centre of the car, and repeat the name of the station in the English language.—*Exchange.*

A Prudent Fireman.

A realistic country newsgatherer says: "The fireman on the fast train of a certain New England road seldom occupies his seat in the cab, preferring to pass his spare time out on the tank. There are three cracks in the parallel rod on his side of the engine."

Forest Fires in Canada.

The smoke caused by the forest fires along the St. Lawrence has made navigation up or down the river from Montreal impossible, and owners and shippers are occasioned a loss of $12,000 a day.

Fast Traveling in the South.

Several paragraphs have been going the rounds of the Georgia press, giving various railroads credit for "the fastest time made in the South." In railroad circles the honor is conceded to engine No. 33, Engineer William Reaney, of the Georgia Railroad. It was during the Black-Colquitt campaign for United States Senatorship, when Major Black was to address the members of the Legislature. A special train was made up for a number of citizens who wished to go up and hear him. The trip from Augusta to Atlanta, a distance of one hundred and seventy-five miles, was made in three hours and twenty-five minutes with nine stops, seven of them long ones. From Conyers to Atlanta, a distance of thirty-one miles, six stations were passed and the run made in thirty-four minutes. This is the best-known record made in the South.—*Augusta Chronicle.*

New Coal and Railroad Company.

A syndicate of Springfield (Ohio) and Eastern capitalists has purchased 68,000 acres of coal land in Breathitt County, Ky., and will at once proceed to open the mines and build railroads by which to reach them. The company has organized with $3,000,000 capital.

Reversing Land Grant Decisions.

The Secretary of the Interior last week rendered two decisions affecting the rights of land grant railroads to indemnity lands. The question arose upon the adjustment made by the Commissioner of the General Land Office of the grant for the Chicago, St. Paul, Minneapolis & Omaha, but is applicable to most of the railroad land grants. The Commissioner, in his adjustment, held that the company was not entitled to indemnity on account of prior grants for other purposes, including the swamp grants, Indian reservations and the moieties of other roads under contemporaneous

grants. This position the Secretary reverses, and holds that the company is entitled under its grant to indemnity for all losses which occurred prior to the definite location of its road, whether before or after the passage of the granting act, except the moieties under contemporaneous grants. The Commissioner also changed the terminal limits of the grant so as to exclude therefrom several thousand acres which were formerly included therein. This, the Secretary holds, cannot be done, and directs that the adjustment be made in accordance with the limits originally fixed at Superior, and fixes the southern terminus at Hudson on the St. Croix River.

The Coupler Question and the Yard Masters.

We have received from the Yard Masters' Mutual Benefit Association, Division No. 5, the preambles and resolutions adopted at a recent meeting. The preambles set forth the well-known facts of injuries to employés from the use of link and pin couplers, the action of the Master Car-Builders' Association in recommending the adoption of a hook coupler, and also the action of the committee known as the "Shinn Committee." They further state that "There is good reason for belief that if the recommendations of the committee of the Master Car-Builders' Association, and the resolution of the committee of experts hereinbefore mentioned, are not now carried out with promptitude and energy, the general introduction of uniform automatic safety car couplers will be indefinitely postpoued, and the serious risk to the lives and limbs of railroad yardmen and brakemen will be perpetuated for many years to come."

The following is the resolution adopted: *Resolved:* That this Association of Yardmasters take immediate steps for the preparation of a petition to be forwarded to the presidents and general managers of the railroads represented in the Association, respectfully requesting that executive action be taken to enforce the recommendation of the Master Car-Builders' Association, and the Expert Committee above mentioned in the preamble, thereby guaranteeing uniformity of practice, safety to employés and economy for the respective companies.

A Roadbed of Salt.

In the Colorado desert, near Idaho, there is a large bed of rock-salt, and the Southern Pacific Railroad, in laying the track to the salt-bed, has been obliged to grade the road for 1,200 ft. with blocks of these crystals. This is the only instance where the roadbed is laid and ballasted on salt. The sea which once rolled over this place dried up and left a vast bed of salt nearly fifty miles long. The supply is inexhaustible, and the quality excellent.

Japan—Trade of Kanagawa in 1886.

With the opening of 1886 the foreign trade of Kanagawa and of Japan generally entered upon a new and brighter era, and was the largest by close on £1,000,000 since the port's extstence. In imports the increase was £237,009, or over 6 per cent. Of this amount, engines, fittings, and machinery increased by £28,536, or 61 per cent., and metals, including their manufactures, by £73,115, or 21 per cent. Of the imports, Great Britain and India sent one-half, Germany, the next European country, 6 per cent., and the United States 9 per cent. The foreign carrying trade of the port was distributed last year in the following proportions: British, 56 per cent.; American, 24 per cent.; German, 10 per cent.; French, 7 per cent. The transpacific carrying trade of 1886 was divided between British and United States shipping in about exactly equal shares. The steamers of the Canadian Pacific line taking cargoes and passengers from the ports of China and Japan to Vancouver, not only for Canada but also for Europe and the United States via the Canadian Pacific Railway, and other connecting lines and steamers, will before long attract not only the bulk of the tea that has hitherto been taken via the Suez Canal, but also a fair share of the general export trade hitherto passing through San Francisco. —*Consular Reports.*

TECHNICAL.

Blast Furnace Statistics for October 1st.

The *American Manufacturer* gives its usual list of the furnaces in and out of blast on the first of the month, as below:

	In blast.		Out of blast.	
Fuel.	No.	Weekly capacity.	No.	Weekly capacity.
Charcoal	73	15,171	104	14,440
Anthracite	129	36,044	79	19,924
Bituminous	151	93,423	61	25,505
Total	346	144,638	244	56,159

As compared with a year ago, the condition of the furnaces in blast is as follows:

	Oct. 1, 1887.		Oct 1. 1886.	
Fuel.	No.	Weekly capacity.	No.	Weekly capacity.
Charcoal	73	15,171	66	11,105
Anthracite	122	36,044	121	34,090
Bituminous	151	93,423	132	76,270
Total	346	144,638	319	121,476

The number of furnaces in blast and their weekly capacity for the thirteen months commencing Oct. 1, 1886, was as follows:

	Charcoal.		Anthracite.		Bituminous.	
Date.	No.	Weekly capacity.	No.	Weekly capacity.	No.	Weekly capacity.
1886.						
Oct. 1	59	11 271	118	33 476	135	77,127
Nov. 1	62	10 565	112	32,761	138	79,405
Dec. 1	67	11,818	115	32 614	141	78,832
1887.						
Jan. 1	66	11,895	126	35.633	140	80 132
Feb. 1	68	12,235	137	38,099	148	85,921
March 1	61	11,572	142	39,767	146	83,834
April 1	59	11,337	143	39,477	151	86,7 9
May 1	54	10,819	143	40,873	149	86,822
June 1	62	11,809	145	41,288	104	54,767
July 1	77	13,969	136	37,662	101	57 355
August 1	80	14,396	127	35,278	120	70,855
Sept. 1	79	13,900	1 0	36,872	143	87 953
Oct. 1	73	15,171	122	36,044	151	93,423

The noticeable feature in the above is the entire recovery of the bituminous furnaces from the effects of the coke strike, the number of furnaces being equal to that of April 1, and the weekly production greater by 6,700 tons.

The Tangye Gas-Hammer.

This is an adaptation of the steam hammer in which the expansive force of steam is replaced by the explosive force of a mixture of illuminating gas and air. The mixture of gas and air is fed to the working cylinder, above the piston only, from a charging cylinder by means of a slide valve which is controlled by either a hand or foot lever, as in the case of the steam hammer. As the slide valve completes its stroke an aperture into the working cylinder is uncovered through which a flame is injected, causing the explosion. The amount of the mixed gas and air governs the force of the blow, and the hammer is drawn back by a volute spring. The maximum pressure developed is 70 pounds per square inch, and the heaviest blow is equal to 300 pounds falling through one foot, and 120 blows of this force can be delivered per minute. For very light blows a relief valve which can be opened at will is provided. About $\frac{1}{100}$ of a cubic foot of gas is consumed per stroke, and the hammer can at any time be put in operation by lighting the gas jet which causes the explosion.

Electric Motor in England.

The Electrical Car Co., of London, Eng., is about to introduce its system of automatic propulsion on one of the metropolitan tram lines, and is to build a large electrical locomotive for drawing trains on the Underground railway. Under this system the vehicle contains the batteries, which are charged at night and worked in the day. The cars can carry five tons at over twenty miles an hour.

Cut vs. Wire Nails.

The makers of wire nails have for some time claimed a larger number of nails per pound and a greater holding power per nail for their product than could be realized from cut nails, with the result that the representatives of eight nail works located at or near Wheeling made a series of careful tests by counting for number and driving both kinds of nails to within a quarter of an inch of their heads into a Norway pine scantling and noting the force required to draw them, and they publish the following as the results of their investigation:

	No of nails in lb.		Lbs. required to pull nail out.	
	Cut.	Wire.	Cut.	Wire.
20d nails	23	35	1,594	703
10d nails	60	86	808	315
8d nails	90	128	597	227
6d nails	160	206	383	200
4d nails	280	316	286	123

From which they deduce the conclusion that

1 lb. of 20d cut nails equals 1.49 lb. of wire nails.
1 " 10d " " 2.01 " "
1 " 8d " " 1 87 " "
1 " 6d " " 1.49 " "
1 " 4d " " 2.06 " "

Or putting it in terms of the dollar, one dollar's worth of cut nails will give the same service as $1.78 spent in wire nails, if at the same price per pound.

As far as these results go they are interesting and valuable. It is to be regretted, however, that the experiments did not include resistance to shearing, and there is nothing to show that any of the wire nail men were represented on the Testing Committee.

The Simplon Tunnel.

The report has been circulated that the preliminary agreement relative to the Simplon Tunnel has been signed at Berne by the delegates of the Swiss Confederation and those of Italy; that the plans for the work have been approved, and that the necessary money has been provided for, Switzerland to furnish 15 million francs, the cities and provinces of upper Italy 10 millions and the Italian government five millions, the remaining 60 millions to be provided by private bankers. *L'Esprit Pratique*, of Paris, says that this information has been "perfidiously published and is false in all respects;" that it is, in fact, "pure imagination," and from such information as we are able to gather from French exchanges, the Swiss and Italian delegates are still disagreed upon technical as well as financial points.

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Meetings of the stockholders of railroad companies will be held as follows:

Eastern Illinois & Indiana State Line, special meeting, at the office, Chicago, Ill., Oct. 31.

Louisville & Nashville, annual meeting, at the office, Louisville, Ky., Oct. 15.

Momence & State Line, special meeting, at the office, Chicago, Ill., Oct 31.

Carthage & Adirondack, at the office, 12 Broadway, New York, Oct. 17.

Evansville & Terre Haute, annual meeting, at the office, Evansville, Ind., Oct. 17.

Cincinnati, Indianapolis, St. Louis & Chicago, annual meeting, at the office, Indianapolis, Ind., Oct. 25.

Seattle, Lake Shore & Eastern, annual meeting, at the office, Seattle, Wash. Ter., Oct. 20.

East Tennessee, Virginia & Georgia, annual meeting, at the office, Knoxville, Ten., Nov. 16.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

St. Louis & San Francisco, 2½ per cent. on preferred stock, payable Oct. 31.

Railroad and Technical Conventions.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *Western Society of Engineers* holds its regular meetings at its hall, No. 15 Washington street, Chicago, at 7:30 p. m., on the first Tuesday of each month.

The *New England Railway Club* meets at its rooms in the Boston & Albany passenger station, Boston, on the second Wednesday of each month.

The *Brotherhood of Railway Brakemen*, National convention, at Binghamton, N. Y., beginning Oct. 19.

The *Brotherhood of Locomotive Engineers*, annual meeting, Central Music Hall, Chicago, Oct. 19.

The *Boston Society of Civil Engineers* holds its regular monthly meetings at its rooms in the Boston & Albany station, Boston, at 7:30 p. m. on the third Wednesday of each month.

The *New England Roadmasters' Association* will hold its annual meeting at the United States Hotel, Hartford, Conn., on Oct. 19 and 20.

The Use of Oil for Reducing Seas.

The Nautical Society of Hamburg has offered a prize of 500 marks for the best essay on the subject of calming the sea by the use of oil. An exhaustive description of experiments on the effect of oil made up to the present time is required; also a discussion of the arrangements used so far, and especially complete directions for its use by large steamers and sailing vessels, as well as small vessels, pilot, fishing and life saving boats, besides directions for the use of oil at sea and near the coast. The essays are to be written in English or German and sent before Nov. 1, 1887, to the president of the Nautical Society, director of the Navigation School, Capt. F. E. Matthiesen, Hamburg. Competition is not limited by nationality.

Engineers' Society of Western Pennsylvania.

A meeting of this society was held September 20. Mr. T. P. Roberts read a paper on the future of the society. He said that the membership was about 320, the number within easy access of Pittsburgh about 200, and the average attendance 40. He suggested dividing the society into three sections, to hold special monthly meetings, the meeting of the second Tuesday of each month to be of the general society. No action was taken. Mr. Brashear gave an account of the method of mounting of the Lick telescope by Messrs. Warner & Swasey, of Cleveland. He also mentioned the proposition of Prof. Michaelson to make the wave length of light the basis for a standard of linear measure. As this unit can be determined to within one part in five millions or perhaps ten millions, he considered it an appropriate standard.

Petroleum Fuel on the Elevated.

A petroleum-burning locomotive has made several runs lately on the Third avenue line of the elevated. Preparations and experiments with a view to such a test have been in progress for some time.

PERSONAL.

—John Carlisle has resigned as a director of the Cincinnati, Hamilton & Dayton.

— Mr. W. H. Brinkerhoff, M. Am. Soc. C. E., has accepted a position on the editorial staff of *The Engineering and Building Record*, formerly the *Sanitary Engineer*.

— Hon. John D. Kernan has filed his resignation as Chairman of the Board of New York Railroad Commissioners, to take effect Nov. 14, 1887.

—William L. Gilbert, President of the Hartford & Connecticut Western, who has given $400,000 for the erection and maintenance of an orphan asylum in Winsted, Conn., has decided to give the town a public academy, and is arranging plans for the structure. The orphan asylum, which will be known as the Gilbert Home, will be completed in a year. Mr. Gilbert's public benefactions will reach upward of $500,000. He is past eighty years of age.

—Senator Senecal, a leading railroad man of Canada, died in Montreal Oct. 11. He was a Commander of the Legion of Honor of France, had been President of the Richelieu & Ontario Navigation Co. for years, was General Superintendent of Government Railways, President of the North Shore Railway Co. and of the Montreal City Passenger Railway Co. In 1857 he opened the Yanaska River to navigation from Sorel to St. Aime and the St. Francis River from St. Francis. Among the railroads which he constructed are the following: Richelieu, Drummond & Arthabaska Railway, the Laurentian Railway, the St. Eustache Railway, the Berthier Railway, the Lanoraie, Joliette & Valois Railway, the L'Assomption Railway and the Basse Laurentidus Railway. Under his management the Richelieu line was extended from Hamilton and Toronto to Chicoulimi, a distance of nearly one thousand miles. He bore the nickname of "The Uncrowned King of the St. Lawrence."

—Robert Garrett has tendered his resignation as President of the Baltimore & Ohio Co. In his letter to the directors he says:

GENTLEMEN: It is well known to many of you that it has been for some time my fixed desire and intention to withdraw when I properly could from the labors which have been imposed upon me by my official position as President of the Baltimore & Ohio Railroad Co. But, as you are also aware, the policy and undertakings of the company, which I necessarily assumed at the time I accepted the Presidency, were such as to render it improper for me, with a due regard to the interests involved, to withdraw from their prosecution.

Now, however, that arrangements have been made which, as I hope and believe, will secure many of the ends for which we have so long struggled, and the business and finances of the company being in a sound and satisfactory condition, I am in a position to tender you, as I do hereby, my resignation as president of the company. I thank you for the courtesy and consideration which you have uniformly extended to me, and I trust you will be able within a brief period to fix upon a proper person to whom I may surrender the trust with which you have honored me. I am, very respectfully,

(Signed) ROBERT GARRETT.

ELECTIONS AND APPOINTMENTS.

Arcade, of New York.—At the annual meeting this week the following directors were elected: Ex-Judge Charles P. Daly, Arthur B. Claflin, the Hon. Melville C. Smith, George S. Coe, President of the American Exchange Bank; Jerome Fassler, the Hon. George W. Lyon, Henry Sanford, of Adams Express Co.; ex-Secretary of the Treasury William Windom, Benjamin F. Dunning, Cornelius J. Ryan, ex-Senator Edward B. Thomas, the Hon. James F. Pierce, Alfred M. Hoyt.

Brighton Beach.—The company has elected James Jourdan, President; E. R. Langford, Secretary, and George L. Murphy, Treasurer. The Directors are A. S. Robbins, A. B. Bayliss, William Marshall, W. Mair, James Jourdan, U. A. Murdock and George C. Murphy.

Buffalo, Rochester & Pittsburgh.—C. F. Warner has been appointed General Car Agent.

Central Vermont.—The following directors were elected this week: J. Gregory Smith, of St. Albans; J. R. Langdon, of Montpelier; E. C. Smith, of St. Albans; B. P. Cheney, of Boston; Joseph Hickson, of Montreal; E. H. Baker, of Boston, and W. H. H. Bingham, of Montpelier.

Chicago, Milwaukee & St. Paul.—D. C. Jones has been appointed Third Assistant General Freight Agent.

Cincinnati, Hamilton & Dayton.—George Hafer has been elected as director in place of John Carlisle, resigned.

Colorado Midland.—G. A. Cartwright has been appointed General Passenger and Freight Agent, office at Denver, Col.

Dover & Winnepesaukee.—At the annual meeting of the stockholders of this New Hampshire road the old directors and officers were re-elected.

Houston & Texas Central.—W. H. Morrell has been appointed General Agent at St. Louis.

International & Great Northern.—S. H. Spangler has been appointed Master Mechanic at Palestine, Tex.

Kanawha & Ohio.—A. C. Tumy has been appointed General Freight and Passenger Agent, with headquarters in Charleston, W. Va.

Kansas City, Memphis & Birmingham.—W. S. Crenshaw has been appointed Engineer of the Mississippi Division, vice F. J. Aid, resigned.

Kansas City, Texarkana & Gulf.—The directors of this new Arkansas company are C. C. Donian, Chas. E. Bramble, J. C. Weed, L. L. Kellar, and W. L. Whitaker.

Lake Erie & Western.—T. O. Baker has been appointed General Freight and Passenger Agent.

Lincoln, Red Oak & Des Moines.—The incorporators of this Nebraska company are: I. M. Raymond, U. S. Harwood, J. H. McMurtery, J. E. Utt, J. H. Ames, J. A. Buckstaff, Eli Plummer and C. C. Burr, of Lincoln.

Memphis, Fort Scott & Gulf.—J. C. Monroe has been appointed Master Mechanic at Memphis, Tenn.

Minneapolis & St. Louis.—R. B. Langdon, J. D. Springer and C. J. Ives have been elected directors for three years, in place of David Dows, H. R. Bishop and J. C. Ives. C. F. Hatch is elected in place of H. H. Porter. The directors have elected the following officers: President, W. H. Truesdale; Vice-President, J. D. Springer; Secretary and Treasurer, Joseph Gaskill; Executive Committee, W. H. Truesdale, W. D. Washburn, R. B. Langdon and J. D. Springer.

Minnesota & Dakota.—The officers of this company are Henry Culler, President; A. O. Squier, Secretary; and E. H. Cutler, First Vice-President.

New York & Northern Railway.—At the first meeting of this company, which is the successor of the New York City & Northern, Joel B. Erhardt was elected President, Arnold Mayer Treasurer and William W. Rockwell Secretary.

Oregon Pacific.—L. G. Cannon has been appointed Assistant to the General Manager, with headquarters at Corvallis, Oregon.

Owensboro, Falls of Rough & Green River.—The directors of this Kentucky company are: Lafe Green, Falls of Rough; Samuel E. Hill, Hartford; W. J. Dean, Breckinridge County; Wm. Hay, Whitesville; A. C. Tompkins, M. V. Monarch, J. A. Fuqua, T. Venable and S. M. Dean, Owensboro. A. C. Tompkins is President; Lafe Green, of Falls of Rough, Vice-President; George V. Triplett, Secretary, and James H. Parrish, Treasurer.

Philadelphia & Reading.—H. W. Souders has been appointed General Baggage Agent; office at Philadelphia.

Salt Lake & Los Angeles.—The incorporators are Caleb W. West, C. C. Goodwin, P. H. Lannan, J. R. Walker, W. S. McCormick, of Salt Lake, Utah; Herbert R. Houghton, of San Francisco; James Stokes, of New York, and others.

Sioux City & Northern.—The directors of this Iowa company are T. P. Gere, A. S. Garretson, D. T. Hedges, John Hornick, John Peirce, F. C. Hills, C. L. Wright and E. Harkinson.

Texas, Sabine Valley & Northwestern.—At a meeting last week in New York Richard J. Evans was elected Superintendent of Construction.

Toledo, St. Louis & Kansas City.—D. D. Davis has been appointed auditor, with headquarters in Toledo.

Union Pacific.—J. V. Parker has been appointed Assistant General Freight and Passenger Agent, with headquarters at Salt Lake City, Utah.

J. W. Young has been appointed Traveling Passenger Agent at Chicago, vice J. F. Wiley, transferred.

OLD AND NEW ROADS.

Arkansas, Kansas & Colorado.—The contract for grading and bridging this road from Dodge City, Kan., southeast about 30 miles to a new town named Buckline, has been awarded to Streeter & Bradbury, of Denver, Col. The contract calls for the completion of the work by Jan. 1.

Arkansas Valley.—This road, extending from Van Buren to Fort Gibson, Ark., is graded and ready for tracklaying.

Atchison, Topeka & Santa Fe.—The statement of the gross and net earnings of the company for the month of August and for eight months, January to August, is as follows:

Month of August:	1887.	1886.	Inc. or Dec.	P. c
Miles of road operated	2,611	2,418	I 193	...
Gross earnings	$1,501,376	$1,341,951	I. $159,425	11.8
Operating expenses (exclusive of taxes).	813,097	635,658	I. 177,439	27.9
Net earnings	688,279	706,293	D. 18,014	25.5
Eight Months to August 31:				
Miles of road operated	2,509	2,416	I. 84	...
Gross earnings	$12,127,912	$9,586,429	I. $2,514,484	26.1
Operating expenses (exclusive of taxes)	6,566,771	5,277,611	I. 1,289,161	24.4
Net earnings	5,561,141	4,308,819	I. 1,252,322	29.6

The first through train from Kansas City, Mo., to Denver, Col., arrived at the latter place on Oct. 11. The new time card provides for two passenger trains each way between Kansas City and Denver, and five regular passenger trains out of Denver for New Mexican points via Pueblo and La Junta.

The company is taking measures to protect the north approach of the new bridge at Sibley, Mo., from the shifting river currents. Peter McGee is the contractor for the work, which will cost about $40,000.

Construction work on the Santa Fe-Gallup cut-off will begin this month at the mountains west of Las Vegas and Hot Springs, N. M. Three tunnels will be built between there and Santa Fe, and from the latter place the line goes westward, striking the Atlantic & Pacific road at Gallup. The cut-off and the completion of the company's Kiowa branch will shorten the Santa Fe's transcontinental line about 160 miles.

Work on this company's new line between Chicago and Kansas City is progressing. There are 40 miles of rails now laid in Missouri and 60 miles in Iowa and Illinois, while the two bridges at Fort Madison and Sibley are ready for the rails. All the grading between the two cities is done except some of the heavier work, which will be completed by the middle of November. It is expected that regular trains will be running over the line before Jan. 1.

The contract for building the depot at Las Animas, Col., has been given to Riley & Bradley.

Atlantic, Birmingham & Kansas City.—The contract to build this road, including erection of all depots, has been let to E. C. Machen, of New York.

Baltimore & Drum Point.—The contract for building the road has been awarded to Rogers & Clement, of New York. Work has begun.

Baltimore & Ohio.—The property of the Baltimore & Ohio Telegraph Co. has been sold to the Western Union Telegraph Co. for $5,000,000 of the latter company's stock. President Garrett was on the ocean at the time the deal was made, and has expressed himself as being much dissatisfied that he should not have been consulted in the matter. The Baltimore & Ohio Railroad Co. makes a contract with the Western Union for the use of the wires along the line of the road.

At the meeting of directors in Baltimore this week the sale of the telegraph company was ratified. President Garrett tendered his resignation as president. A resolution was passed that no dividend should be declared from the earnings of the main stem for the past six months, and declaring a dividend of 5 per cent. from the earnings of the Washington branch.

Boston & Maine.—The Boston & Lowell road and the lines controlled and operated by it passed this week into the possession of the Boston & Maine under the terms of the lease made last summer. The Boston & Lowell lines will hereafter be known as "the Lowell system" of the Boston & Maine. There are to be no changes at present in the officers of the system.

The New Hampshire Legislature has not yet arrived at a decision in the "Railroad Case," but is said to be likely to pass the bill in favor of the Boston & Maine within a few days.

California Central.—The company has contracted for building a road into the San Jacinto Valley.

California & Oregon.—Trains are now running through the long Summit tunnel to a new station called Siskiyou, and the distance covered between the ends of the track by stages is reduced to 13 miles.

California Southern.—This company has agreed to build a road from Perris to San Jacinto, Cal., and work is to begin immediately.

Canadian Pacific.—Sir George Stephen has gone to England to arrange for the building of three large steamers for the Pacific Ocean service between Vancouver, B. C., and Asiatic ports. They will be of 4,000 tons burden.

Central & East Tennessee.—This company will build a bridge at Atlanta, Ga.

Chattanooga Southern.—This company has been incorporated in Tennessee.

Chicago & Eastern Illinois.—At the annual meeting on Oct. 31 the question will be considered of consolidating the property and franchises of the Chicago, Danville & St. Louis with the Chicago & Eastern Illinois, the Strawn & Indiana State Line and the Momence & State Line.

Chicago, Kansas & Arkansas.—Preliminary work on this road is being rapidly pushed. The line has been located from the junction with the St. Joseph & Grand Island road at Wathena, Kan., to the Atchison County line. Liberal subsidies have been voted through Jefferson County, and elections are now pending in Atchison County.

Chicago, Rock Island & Pacific.—It is stated that this company will begin building through Northern and Central New Mexico as early as the weather will permit next year. Thus far the line is surveyed to Taos Valley, 60 miles north of Santa Fe. One branch of the road will cross the Rio Grande at Chamita, 30 miles from Santa Fe, and go west across Southern Utah, striking California at Tulare Lake in the San Joaquin Valley. From the southern end of the Taos Valley the road is intended to run south via Santa Fe and thence down the Rio Grande to El Paso.

Chicago, St. Paul & Kansas City.—Last week the track had been laid 57 miles from Des Moines, Ia.

Chicago, Cincinnati & Charleston.—The company has secured 40 acres of land and will build shops and a passenger depot at Black's, S. C.

Cincinnati, Indianapolis, St. Louis & Chicago.—The Aurora, (Ind.) extension of this road has been opened for business.

Cincinnati, New Orleans & Texas Pacific.—The offices of the General Superintendent, Car Accountant and Inspector of Bridges have been removed from Meridian, Miss., to Cincinnati, O.

Denison & Washita Valley.—The company is about to put 50 or 60 miles of road under construction. A. H. Coffin, of Denison, Tex., is Secretary.

Denver & Boulevards.—The company has been incorporated in Colorado with right to operate a road in Arapahoe, Jefferson, Douglas and Boulder counties.

Dexter & Newport.—The stockholders have voted in favor of building the proposed extension through to the Bangor & Piscataquis road, touching it either at Guilford or Dover, Me.

Dubque & Sioux City.—L. H. Clarke, formerly Chief Engineer of the Lake Shore & Michigan Southern, and D. G. Scott, of Dubuque, Ia., have been appointed a committee to appraise the betterments of this road and the Iowa Falls & Sioux City. These betterments were placed on the lines by the Illinois Central during the period of the leases, and the value is estimated at $1,000,000.

Duluth & Manitoba.—The line is completed to Pembina, Dak., and the Manitoba boundary.

Emory Coal & Railroad.—Charter filed in Tennessee by men living in Chattanooga, Philadelphia, Boston and New York. Capital stock, 1,000,000. One hundred thousand acres of land have been purchased in different counties of this state, besides $150,000 worth of property in Chattanooga.

Eufaula & East Alabama.—Work was begun last week on the extension from Clayton to Ozark, Ala. Right of way is secured for the entire distance, and the road will be completed without delay.

Evansville & Indianapolis.—This company has built a branch from Saline City, Ind., to Brazil, connecting there with St. Louis, Vandalia & Terre Haute and the Chicago & Indiana coal road.

Georgia.—The bills introduced in the Legislature to incorporate the Atlantic, Birmingham & Great Western, the Louisville, Waynesboro & Alexander, the Cartersville, Marysville & Knoxville, and the Thomasville, Florida & Western railroad companies have become laws.

Kalamazoo & Saginaw.—The road is completed from Kalamazoo to Kingsbury, Mich., and two trains a day are now running. It will be finished to Hastings, 8 miles further, this month.

Kansas City, Memphis & Birmingham.—Freight and passenger trains began running through on Oct. 15. Passenger trains will be run on a schedule of 25 miles an hour. The general offices of the road will be in Birmingham, Ala.

Kansas City, Texarkana & Gulf.—Incorporated in Arkansas. The proposed road will run from Texarkana through the counties of Little River, Sevier, Howard, Polk, Scott and Sebastian to Fort Smith, a distance of 180 miles. Capital stock, $4,000,000.

Lehigh Valley.—It is rumored that the company has made an arrangement with the Pennsylvania and the Central of New Jersey by which it secures a terminus at tidewater in Jersey City. The company has been trying to obtain this for years by litigation. By the terms of the compromise the Lehigh gets an outlet to tidewater through the property of the Morris Canal Co., with the understanding that the canal is to be cut off at Mill Creek, the creek to be turned into a ship canal and have its outlet at Communipaw. The present canal will be filled in east of Mill Creek and used as a roadbed for the Lehigh Valley road, which will run a double track from the Pennsylvania cut at the Point of Rocks and thence to the point where the Morris Canal intersects Mill Creek at Grand street, Jersey City.

Lincoln, Red Oak & Des Moines.—Articles of incorporation filed in Nebraska. Steps are being taken for a survey from Lincoln to the Missouri River.

Louisville, Cincinnati & Virginia.—Garvey Bros., Lee & Kenefick, of Winchester, Ky., have contracted to build the road from Winchester to Beattyville.

Mahoning & Shenango.—The New York, Lake Erie & Western has commenced suit at Youngstown, O., against this newly organized company, to have its charter canceled. An injunction was also allowed. The company was organized to build a line from the Doughton Station, on the Lake Shore & Michigan Southern. The petition alleges that the incorporators are ostensibly private individuals, but that they are really the agents of the Lake Shore, which, by the provisions of its charter, is debarred from building a road through Mahoning and Trumbull counties. There is likely to be considerable of a fight over the matter.

Maine Central.—The company will build 200 flat cars and three new snow plows during the coming winter.

Marin & Napa.—The grading of this California road is nearly completed. The bridge over Petaluma Creek will be 3,000 ft. in length.

Midlothian, Manchester & Richmond Railway, Mining & Lumber Co.—Bids are wanted for building 16¼ miles of railroad, no bridges. Address John E. Taylor, 1,115 Main street, Richmond, Va.

Minnesota & Dakota.—Last summer a survey was started from the Northern Pacific line, near Hawley, Minn., and run from there to Caledonia, Dak., Mayville, Sherbrooke and Devil's Lake. It was conducted mysteriously, and the engineers professed not to know by whom they were hired. It has now developed that a company of the above name is conducting the enterprise. The line is to be completed next season; also one from Fargo to Sherbrooke. The stockholders of the company are mainly Boston men, and the capital is $5,500,000. The headquarters will be at Fargo, Dak.

Mississippi, Faribault & Western.—The survey is practically completed between Faribault and Willmar, Minn. It is said to be the intention of the company to place an engineer's corps between Faribault and the Mississippi River as soon as the survey west of Faribault is finished.

Missouri Pacific.—The company is reported to have leased the Carbondale branch of the Union Pacific running from Leavenworth to Carbondale, Kan.

Mobile & Ohio.—This company's transfer steamer, the W. Butler Duncan, was run into and sunk in the harbor at Cairo, Ill., on Oct. 9.

Montana, Syracuse & Texas.—The company is making surveys for its road, which is to extend from Miles City, Mont., to Galveston, Tex. It is not stated whether the road will be two track or four track.

New Roads.—A subscription of $25,000 has been voted to a railroad to be built through Morgantown to Berkley Springs, W. Va.

New York Central & Hudson River.—It is said that many merchants and manufacturers of Watertown, N. Y., have signed an agreement to give all their passenger and freight business to the company if it will build a branch from that city to a connection with the road at Oneida, and running through to Clayton or Alexandria Bay, on the St. Lawrence. The document will be presented to the company this week.

New York & Northern Railway.—The property and franchises of the New York City & Northern have been turned over to the Purchasing Committee. The new corporation bears the above name. A double track branch is to be built from Van Courtlandt Station to Getty Square in the city of Yonkers. This is to be in operation before next January.

Niagara Central.—This new road from Suspension Bridge to Thorold, Ont., was opened on Oct. 12.

Northern Pacific.—The company will next summer build a branch to the vicinity of White Sulphur Springs, Mont., a district that promises to become a profitable mining section.

Norfolk & Western.—Twenty-seven hundred men are at work on the Clinch Valley Division from Tazewell Court House, Va., to Bluestone Gap.

Ohio & Northwestern.—This company intends to extend the Columbus & Maysville road to Ripley, O. The latter road was purchased at Receiver's sale last spring. It is completed from Hillsboro to Sardinia, O. The line will be built via Georgetown, to which place it is to be completed by Dec. 1.

Otay.—Incorporated in California to build a road from a point on the National City & Otay to the Mexican line, a distance of 15 miles.

Owensboro, Falls of Rough & Green River.—Organized at Owensboro, Ky., to build a road from that place to Falls of Rough, on the Green River, about 35 miles.

Pennsylvania.—The Bryn Mawr Hotel, at Bryn Mawr, Pa., the property of this company, was destroyed by fire on Oct. 11. The loss is $230,000, and the insurance $150,000.

The third track is being put down on the main line between Coatesville and Cala, Pa. The fourth track now extends from Philadelphia to Berwyn, 18 miles.

Philadelphia & Reading.—Masters Dallas and Pollock have filed their report in the Robinson suit against this company. The suit was begun two years ago, during which time a great mass of testimony has been taken culminating in a decree of foreclosure in March last. The Court directed the Masters to report the extent and amount of liens prior to the general mortgage dated July 1, 1874; full and detailed statements of the properties subject to the lien of this mortgage; what liens are upon the several properties prior to the general mortgage; and, finally, an order of sale of the mortgaged properties and a form of advertisement. These several matters are all treated of in the report.

It is reported that a pool of capitalists has been formed to take care of this company's first series 5s. The Barker-Kemble party has accepted the purchase and the bonds will be transferred at once. Details of the plan have not come out.

Pittsburgh, Fort Wayne & Chicago.—The City Council of Lima, O., had the police stop the work of this company in putting down switches in that city on Oct. 8, as the company was trespassing on property belonging to the city.

Powells Valley.—Work was begun last week on this road, which will extend from Knoxville, Tenn., to Cumber-

land Gap, where it will connect with the Louisville & Nashville and the Norfolk & Western.

Richmond & Danville.—The company intends building a road from Bridgewater to the foot of Linville Mountain, N. C., and has made surveys.

Rocky Fork & Cooke City.—T. D. Corning has received the contract for building this road from Bozeman to Rocky Fork, Mont., and has commenced work.

St. Paul & Duluth.—President Fisher says that the company will put in docks, machine-shops, and other extensive improvements at Superior, Wis., thus transferring the terminus from Duluth to Superior.

St. Paul, Minneapolis & Manitoba.—The Montana extension is completed to within less than 30 miles of Great Falls. It now extends 519 miles from Minot, Dak.

Salt Lake & Los Angeles.—This company, already reported as incorporated, is actively engaged in perfecting its plans. Two hundred thousand dollars have been subscribed. The right of way has been secured to the Nevada line from Salt Lake City. In a direct line the distance from Salt Lake to Los Angeles is a little over 600 miles.

San Francisco & San Joaquin Valley.—The incorporators of this company have obtained right of way for the road from Mojave to Bakersfield, Cal. The road is projected to run from Antioch to Mojave. The President of the company, J. R. Wiburn, of San Francisco, says that this is an independent enterprise, and that the line will certainly be built as soon as possible.

Santa Rosa & Carquinez.—The grading is completed from Santa Rosa to Sonoma, Cal.

Seattle, Lake Shore & Eastern.—The first 40 miles of this road is graded and 11 miles of rails are laid, and enough more rails are on the ground to lay 23 miles more.

A contract has just been let for a 40-mile extension from the present eastern terminus at Squak, W. T.

Shreveport & Arkansas.—The gaps between Shreveport, La., and the Arkansas line are being filled rapidly, and in 60 days the roadbed will be ready for tracklaying.

Sioux City & Northeastern.—Negotiations are in progress for the consolidation of this company with the Duluth, Red Wing & Southern.

Sioux City & Northern.—Incorporated in Iowa to build a road from Sioux City northward through Woodbury, Plymouth and Sioux counties to points on the boundary line between Iowa and Minnesota, and thence to Duluth, Minn., and Minot, D. T.

Southern Pacific.—The company has arranged to build three new lines, one from Colton to San Bernardino, Cal., thence to Redlands, Crafton, Lugonia and Brookside; another from the end of the present spur track to Slover Mountain, on through Agua Mansa to Riverside and South Riverside; and another from the east end of the Colton Bridge over the Santa Ana River, southwestward about 8 miles to Pigeon Pass, in which there will be a short tunnel which will lead directly into the San Jacinto Valley.

Tennessee Central & Alabama.—The road is to go from Sheffield, Ala., to Trenton, Tenn., where it makes connection with the Mobile & Ohio. At Milan it will connect with the Illinois Central and Louisville & Nashville. Between Trenton and Milan the road is about completed and is expected to be in operation by Dec. 15.

Tennessee Midland.—The company made application this week to Davidson County for a subscription of $500,000 to its capital stock. This differs from the recent application which was voted on and defeated, as that did not guarantee that the road would be built east of Nashville. Under the present application $200,000 is to be paid when the road is constructed through from Memphis to a point 100 miles east of Nashville, $200,000 when it is completed to the Cincinnati South rn, and $100,000 when its entire line is constructed to the Virginia state line. It is generally believed that this application will be favorably voted on.

Union Pacific.—It is stated that the company has closed negotiations with the Atchison, Topeka & Santa Fe for the purchase of the Leavenworth, Topeka & Southwestern, with the purpose of turning it over to the Chicago, Rock Island & Pacific. The Leavenworth road is 46 miles long, extending from Leavenworth to Meriden, Kan., owned jointly by the Union Pacific and the Atchison. The Rock Island intends running a line through Leavenworth, and therefore the short road can be utilized by it to advantage.

The company will build a depot at Council Bluffs, Ia.

Wabash.—Judge Gresham has issued an order to Receiver McNulta that he disburse $1,000,000 now in the company's treasury, in taking up past due coupons on the first mortgage bonds.

Warrior Coal Fields.—The contract is let for grading this road from Meridian, Miss., to Gainesville, Ala., and work will begin this week. The road is projected to be built through the Alabama coal fields to Decatur, Ala.

Wellsville & New Lisbon.—Engineers went to work this week on a survey of this road, which is projected to run from Wellsville to New Lisbon, Ohio.

Western New York & Pennsylvania.—The Secretary of State in New York has refused to accept a certificate of incorporation of this company, as the latter endeavored to file it without paying the organization tax on $15,000,000. The company makes the claim that it is the successor of the Buffalo, New York & Philadelphia Co., and that the latter had paid the tax upon $20,350,000, and had changed its name and reduced its tax. The certificate is refused on the ground that a company cannot reduce its capital stock without consent of the Comptroller, and that a railroad corporation must have the consent of the Railroad Commissioners, neither of which the company had.

Wisconsin Central.—The company has bought the Chicago, Harlem & Batavia "dummy" road in Chicago, and a double track will be laid and the route operated in connection with the main line.

Western Union Telegraph.—The annual report for the year ending June 30 in comparison with the previous is shown as follows :

	1887.	1886.
Gross	$17,191,909	$16,298,639
Operating expenses	13,154,628	12,378,783
Net	$4,037,281	$3,919,856
Interest and sinking fund	533,065	534,452
Balance	$3,504,216	$3,385,404
Dividends	811,864	3,399,573
Surplus	$2,692,352	Def. $14,169
Surplus June 30	7,002,185	4,309,835
Miles poles	156,814	151,832
Miles wire	524,641	489,607
Messages	47,394,530	43,289,807

	1885.	1884.
Gross	$17,706,834	$19,632,940
Operating expenses	12,005 910	13.022,504
Net	$5,700,925	$6,610,436
Interest and sinking fund	535,064	512,341
Balance	$5,165,861	$6,098,095
Dividends	4,999,325	5,599,179
Surplus	$166,536	$498,916
Surplus June 30	4 324,004	4,157,469
Miles poles	147,500	145,337
Miles wire	462,283	450,571
Messages	42,096,583	42,076 226

The number of messages handled was the largest ever received in any one year with the exception of 1881. The average rate per message was 30¼ cents against 30.9. The report showed that since 1881 the company has spent $10,574,233 in construction and purchases. The acquisition of the Baltimore & Ohio system of 60,000 miles, with the completion of certain extensions that the Western Union has already under way, will give the Western Union 600,000 miles of wire in active operation.

The stockholders voted to issue $5,000,000 of new stock, made necessary by the issuance of that much stock to the Baltimore & Ohio Company, President Green announced that the policy of the Western Union Company would be to close all Baltimore & Ohio offices not really needed for the transaction of business in towns where the Western Union's own lines were sufficient to give adequate public service.

West Jersey.—Several branches of this road will shortly be merged with the principal company. The recent privilege given stockholders to subscribe to new stocks at par was fully availed of, the allotment amounting to $299,150. An additional amount of $215,000 of new stock, it is stated, will be issued for the purpose of effecting the merger and consolidation of the branch lines, which will bring the total capital stock of the West Jersey up to $2,000,000.

TRAFFIC AND EARNINGS.

Mileage Tickets.

The Chicago & Grand Trunk and Detroit, Grand Haven & Milwaukee have decided to issue to all who apply one thousand mile tickets, limited one year from date of issue, good for the one person named on the ticket, at 2 cents per mile. This action is at variance with the wishes of most of the roads in the Central Traffic Association, who wish to make the rate 2½ instead of 2 cents, and have protested against the stand taken by the Grand Trunk lines.

Railroad Earnings.

Earnings of railroad lines for various periods are reported as follows :

Month of August :	1887.	1886.	Inc. or Dec.		P.c.
Allegheny Valley.	$192,725	$164,493	I.	$28,232	11.0
Net	83,483	67,099	I.	16,384	24.4
Atch., T. & S. F.	1,501 374	1,341,951	I.	159,425	11.8
Net	688.279	706,293	D.	18,014	2.5
Balt. & Potomac.	116 227	114,897	I.	1,330	1.1
Net	48,974	49,239	D.	265	1.5
Cairo, V. & Chic.	78,322	60,777	I.	17,545	28.8
Net	37,146	14 596	I.	22,550	154.1
Cam. & A. & Br.	149 989	128,701	I.	21,288	16.5
Net	85.171	75,391	I.	9,780	12 9
Chi., Bur. & No.	181,226	...	...	...	...
Net	45,256	...	...	...	...
Chi., Bur. & Q.	2,382,102	2,748,174	D.	366,072	13.3
Net	957,405	1,529.244	D.	571,839	37.3
Den. & R. G.	734,034	614,639	I.	119.395	19.4
Net	312 294	248,522	I.	63.772	25.4
Den. & R. G. W.	118,218	...	...	...	...
Net	37,489	...	...	...	...
Louis. & Nash.	1,369,561	1,196,284	D.	173,277	14 4
Net	552,464	507,279	I.	45,185	8.9
Lou. N. O. & T.	134,174	118,404	I.	15,770	13.3
Net	30,806	30,552	I	254	.8
Mexican Cen.	374,117	270,091	I.	104 026	38.5
Net	154.612	74,871	I.	79,741	106.4
Minn. & N. W.	171.554	45,804	I.	125,750	274.5
Net	63,684	18,703	I.	44,981	240 5
Minn. & St. L.	105,900	126,882	D.	20.982	16.5
Net	30,426	48 042	D.	17,616	36.6
Newport News & Mississ. Valley Co.:					
Ches. & Ohio	415,359	410,966	I.	4 393	1.0
Net	131,834	137,329	D.	5,495	4.0
Eliz., Lex. & B S.	100,056	91,028	I.	9, 28	9.9
Net	39,971	38,174	I.	3,797	10.4
Ches. O. & S. W.	178,982	147.400	I.	31,582	21.4
Net	81,421	59,908	I.	21,513	35.9
Ohio & Miss	409.911	378,100	I.	31,811	8.4
Net	184,981	143,312	I.	41.669	29 0
Oregon R. & N. Co.	423,776	460,081	D.	37,305	8.1
Net	181,923	205,585	D.	23,662	5.8
Pitts. & West.	192,231	...	...	...	...
Net	59,178	...	...	...	...
Scioto Valley	78,585	69.749	I.	8,836	12.6
Net	28 806	16,721	I.	12,085	72.3
Shenandoah Val.	87,260	80,367	I.	6,893	8.5
Net	20,303	25,629	D.	5,326	20.8
West J. and Brs.	231,060	217,918	D.	13.142	6.0
Net	111,185	113,327	D.	2,142	1.8
Total (gross)	$9,511,524	$8,959,392	I.	$552,132	6.1
Total (net)	4,286,182	4,523,458	D.	237,276	5.2
Month of September :					
Atlantic & Pac.	$163,653	$146,654	I.	$16,999	11.5
Buff., R. & Pitts.	175,397	153,639	I.	21,758	14.1
Cali. South	109,407	67,803	I.	41,604	61.3
Chi. & Atlantic	207,469	184,315	I.	23,154	12.5
Cin., R. & Ft. W.	38,392	37,191	I.	1,201	3 4
Chi., St. L. & P.	518,486	463 505	I.	54,981	11.8
Chi. & W. Mich.	119.146	108,855	I.	10,291	60.1
Cleve. & Canton	36,744	32,807	I.	2,937	8 9
C., L., St. L. & C.	245,850	245,553	I.	297	.1
Cin., W. & Balt.	223,290	203,710	I.	19,580	9.6
Den. & R. G. W.	120,000	80,000	I	40,000	50.0
Det., Lan. & No.	113,642	127,242	D.	13,600	11.6
E. Ten., Va. & G.	484,566	384,158	I.	100,408	26.1
Evans. & Indianapolis	22,672	20,261	I.	2,411	11 8
Evans. & Terre H.	76,676	68,728	I.	7 948	11.3
Flint & P. M.	66,365	58,580	I.	7,785	13.2
Georgia Pacific	120,587	87,820	I.	32,767	37.3
Gt. R. & Ind	221,557	194,568	I.	26,989	13.8
Hous. & Tex. C.	353,994	378,929	D.	27,005	7.1
Kingston & Pem.	18,895	13,809	I.	5,086	36.8
Lake Erie & W.	211.315	180,169	I.	31,206	17.3
Lou., Ev. & St. L.	92,266	88,215	I.	4.051	4.5
Memphis & Chas.	150.538	120.679	I.	29.858	24.7
Milw., L. S. & W.	332,123	242.531	I.	89,592	36.6
N. Y. City & No.	49,387	47,082	I.	2,305	4.8
N. Y., Ont. & W.	158.249	129.483	I.	28 766	22.2
Ohio & Miss.	402,460	393,260	I.	9.200	2.3
Peoria, Dec. & E.	77.854	90,481	D.	12,627	13.9
St. P. & Duluth	179.814	210,721	D.	30,907	14.6
St. P., M. & Man.	847.800	823,380	I.	24,420	2.9
Wabash (West).	636,000	507,000	I.	129 000	25.4
Wisconsin Cen.	187,300	139,879	I.	47,421	4.3
Chi., W. & M.	58,031	...	...	...	...
M., St. C. & W.	46,893	35,533	I.	11,360	31 9
Wis. & Minn.	27,883	20,255	I.	7,628	32.6
Total	$7,672,600	$6,770,114	I.	$987,701	....
			D.	$85,215	...
Net			I.	902,486	13.3

Eight Months, Jan. 1 to Aug. 31:					
Alleg. Val.	1,302,592	1,162,095	I.	140,497	12 0
Net	482,888	414,083	I	68 805	16.6
Atch. Top. & S. Fe	12,127,912	9.586,429	I.	2,541.483	26.5
Net	5,561,141	4.308,819	I.	1,252.322	29.6
Balt. & Poto	934,871	862,373	I.	72,498	8.4
Net	331,604	332,463	D.	799	.2
Cam. & Atl. & Brs	510,278	440,963	I.	69.315	15 7
Net	146,677	116 884	I.	29.793	25.4
Chi., Burl. & Q.	17,896,010	16 602,276	I.	1,223.734	7.3
Net	7,922.859	7,542,332	I.	380,527	3.9
Denver & R. G'd.	4,967,742	4,104,663	I.	863.079	21.2
Net	2,016,270	1,423,906	I.	586.364	41.1
Louisv. & Nashv.	10,116.399	8,784,024	I.	1,332,375	15.1
Net	2,825,508	3,339,948	I.	485,560	11.5
L., N. O. & Tex.	1,170,252	960,543	I.	209 706	21.8
Net	253,981	186,603	I.	67.378	36.1
Mexican Cen.	3,066,274	2,389,895	I.	676,379	28.3
Net	1,351,571	733,723	I.	617.848	84.2
Minn. & N. W.	784,582	288,817	I.	515.765	191 8
Net	235,778	97.789	I.	137,989	141.0
Minn. & St. L.	941,553	933.045	I.	8,508	.9
Net	235,867	254.910	D.	19,043	7.4
Newport News & Mississippi Valley Co.:					
Ches. & Ohio	2,864.551	2,636 294	I.	228,257	8.6
Net	860.523	776,120	I.	84,403	10.8
Eliz., L. & B. S.	682,776	580.350	I.	102,426	17.6
Net	226,602	197,419	I.	29,183	14.7
Ches. O. & S. W.	1,179,633	1,025.087	I.	154,546	15.0
Net	454,550	347,858	I.	106,692	30.6
Total N. N. & M. V. Co	4,726 960	4,241,731	I.	485.229	11.4
Net	1 541 975	1,321,397	I.	220,278	16 6
Ohio & Miss	2,623,927	2,444,252	I.	179.675	7.3
Net	897,587	678,232	I.	219,355	32.3
Or. Ry. & N. Co.	422,776	460.081	D.	37.305	8.1
Net	161,923	205,585	D.	42.662	21.2
Shenan. Val	554,473	448.110	I.	106,364	23.7
Net	85,892	55,741	I.	30.151	54.1
West J. & Br.	1,031.545	943,415	I.	88,130	9.3
Net	405,720	362.507	I.	43.213	14.9
Total (gross)	63,108,146	54,632,715	I.	8,475,431	15.3
Total (net)	25,451,001	21,374,922	I.	4,139,583	....
			D.	63,504	....
Net			I.	4,076,079	19.0

Early reports of monthly earnings are usually estimated in part, and are subject to correction by later statements.

Coal.

The coal tonnages for the week ending Oct. 8 are reported as follows:

	1887.	1886.	Inc. or Dec.		P.c.
Anthracite	726,958	776,039	D.	49,081	6.3
Bituminous	325,924	287,321	I.	38,603	13.4

The coal tonnages of the Pennsylvania road for the week ending Oct. 1 are reported as follows :

	Coal.	Coke.	Total.
Line of road	191,324	91,874	283,203
Year to Oct. 1	7,621,268	2,606,294	1,027,562
To Oct. 1, 1886	6,290,606	2,590,042	8,886,648

The coal tonnage of the Pennsylvania road for the week ending Oct. 8 is reported as follows:

	Coal.	Coke.	Total.
Line of road	188,462	92,133	280,595
Year to Oct 8	7,809,730	2,698,427	10 508,157
To Oct. 8, 1886	6,485,093	2,662,333	9,147,426

Cumberland coal shipments for the week ending Oct. 8 amounted to 81,615 tons, and for the year to that date 2,451,728 tons.

Cotton.

The cotton movement for the week ending Oct. 7 is reported as below, in bales :

Interior markets :	1887.	1886.	Inc. or Dec.		P. c.
Receipts	163,298	138,121	I.	25,177	18.2
Shipments	134,260	99,200	I.	35,060	35.3
Stock	147,999	111,575	I.	36,424	32.6
Seaports :					
Receipts	251.186	197,166	I.	54,020	27.3
Exports	170.439	89,516	I.	80.923	90.4
Stock	425,896	407,179	I.	18,717	4.5

East-bound Shipments.

The shipments of flour, grain and provisions eastward from Chicago to seaboard points amounted last week to 25,373 tons, against 26,878 tons for the week previous. The percentages of the different roads were: Chicago & Grand Trunk, 13.6; Michigan Central, 26.4; Lake Shore & Michigan Southern, 12.3; Pittsburgh, Fort Wayne & Chicago, 19.6; Chicago, St. Louis & Pittsburgh, 9.9; Baltimore & Ohio, 8.4; New York, Chicago & St. Louis, 9.6; Cincinnati, Indianapolis, St. Louis & Chicago, 0.2.

Western States Passenger Association.

The Minnesota & Northwestern has issued the following notice :

This company has given the required notice of withdrawal from the Western States Passenger Association, which expires Jan. 1, at which time a 2,000-mile ticket will be sold over this company's line at 2 cents per mile. Should our competitors take any retaliatory action against us prior to Jan. 1, 1888, for the independent attitude we have assumed, their action will be met at once by this company.

It is said that the Chicago, Rock Island & Pacific has issued a similar notice.

An Arrest Under the Inter-state Law.

Division Superintendent Graham, of the Northern Pacific Railroad, was arrested last week in Fargo, Dak. The arrest is the culmination of a bitter fight between Mr. Hawks, of Buffalo, Dakota, and the Northern Pacific road. Mr. Hawks was refused cars for his wheat, he claims, and he then put the grain in sacks and delivered them at the station as common freight. He filled the platform and piled bags up in the waiting-room until the station agent could hardly find room to breathe. Then the railroad company offered him cars, but he wanted to empty the sacks and ship the wheat in bulk. The company refused to allow this, and afterward, Mr. Hawks says, refused to give him cars to ship the sacks. He then caused the arrest of Division Superintendent Graham under the Inter-state Commerce law, which prohibits unjust discrimination. It is said that the grain law of Dakota makes it the duty of the railroads to furnish cars to farmers on side tracks, and Mr. Hawks first made his demand for cars under this provision of that law.

Western and Northwestern Freight Bureau.

The managers of the lines interested in the Western and Northwestern sections of this bureau met in Chicago last week. The meeting resulted in an agreement to continue the association in full force and effect, regardless of the notices which have been filed by the Chicago, Burlington & Northern, Chicago, Milwaukee & St. Paul, Wisconsin Central and other railroads to withdraw from the association. Some slight modifications were made to admit of such action as seemed necessary to meet competition, it being provided that the chairman should authorize such rates as are necessary to meet competitors' rates. Any question arising regarding the advisability of changing such rates to be taken up at a meeting to be called by the chairman within five days.